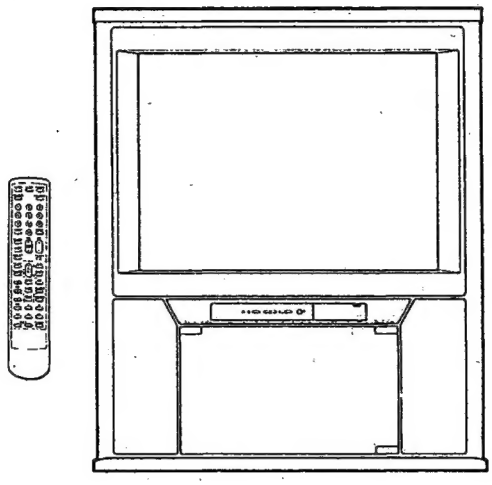
KV-27TW77/27TW78
KV-32TW77/32TW78
RM-Y118

SERVICE MANUAL

US Model

KV-27TW77 Chassis No. SCC-F84F-A
KV-27TW78 Chassis No. SCC-F84G-A
KV-32TW77 Chassis No. SCC-F84J-A
KV-32TW78 Chassis No. SCC-F84K-A



AA-1 CHASSIS

MODELS OF THE SAME SERIES	
KV-27TW77/27TW78 KV-32TW77/32TW78	KV-27TS29/27TS32/27TS36 KV-32TS36/32TS46
KV-2970RS/2970M/2975M	

SPECIFICATIONS

Television system American TV standards

Channel coverage
VHF: 2–13
UHF: 14–69
Cable TV: 1–125

Picture tube
Hi-Black Trinitron® tube
27-inch picture measured diagonally
29-inch picture tube measured diagonally (KV-27TW77/27TW78)

32-inch picture measured diagonally
34-inch picture tube measured diagonally (KV-32TW77/32TW78)

Antenna 75-ohm external antenna terminal for VHF/UHF

Input
VIDEO and S VIDEO
S VIDEO IN (S terminal)
Y: 1 Vp-p, 75-ohms unbalanced, sync negative
C: 0.286 Vp-p (Burst signal), 75-ohms
Video (phono jacks): 1 Vp-p, 75-ohms unbalanced, sync negative
Audio (phono jacks): 500 mVrms (100% modulation)
Impedance: 47 kilohms

Output
AUDIO OUT (phono jacks)
More than 408 mVrms at the maximum volume setting (variable)
More than 408 mVrms (fix)
Impedances: 5 kilohms

– Continued on next page –

MICROFILM

TRINITRON® COLOR TV
SONY®

Speaker output 5 W × 2

Audio frequency response: Front 80 Hz – 20 kHz

Power requirements 120 V AC, 60 Hz

Power consumption

KV-27TW77	170 W
KV-27TW78	170 W
KV-32TW77	195 W
KV-32TW78	195 W
standby mode	5 W

Dimensions/Weight

	Dimensions (w/h/d)	Weight
KV-27TW77	750 × 1041 × 655 mm (29⅝ × 41 × 25⅞ in.)	83.6 kg (184 lbs)
KV-27TW78	750 × 1041 × 655 mm (29⅝ × 41 × 25⅞ in.)	83.6 kg (184 lbs)
KV-32TW77	895 × 1117 × 700 mm (35¼ × 44 × 27⅝ in.)	108.6 kg (239 lbs)
KV-32TW78	895 × 1117 × 700 mm (35¼ × 44 × 27⅝ in.)	108.6 kg (239 lbs)

Supplied accessories

Remote Commander RM-Y118(1) with 1 size AA (R6) EVEREADY battery

Recommended accessories

U/V mixer EAC-66
Connecting cable
VMC-810S/820S, VMC-720M, YC-15V/30V, RK-74A

Design and specifications are subject to change without notice.

(CAUTION)

SHORT CIRCUIT THE ANODE OF THE PICTURE TUBE AND THE ANODE CAP TO THE METAL CHASSIS, CRT SHIELD, OR CARBON PAINTED ON THE CRT, AFTER REMOVING THE ANODE.

WARNING!!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS.
THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

SAFETY CHECK-OUT
(US Model Only)

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the condition of the monopole antenna (if any).
   Make sure the end is not broken off, and has the plastic cap on it. Point out the danger of impalement on a broken antenna to the customer, and recommend the antenna's replacement.
8. Check the B+ and HV to see they are at the values specified. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
9. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

HOW TO FIND A GOOD EARTH GROUND

A cold-water pipe is guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth-ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60–100 watts trouble light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line, the lamp should light at normal brilliance if the screw is at ground potential. (See Fig. B)

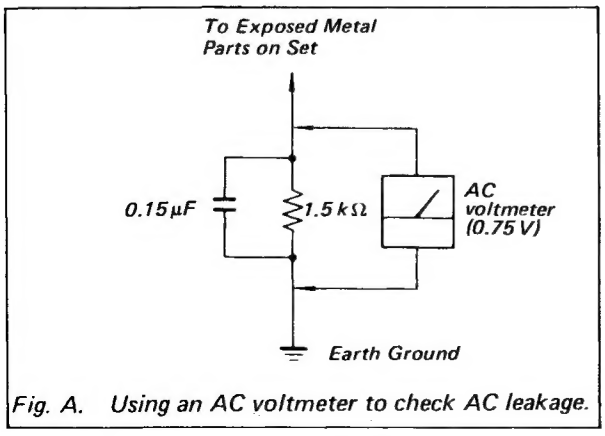


Fig. A. Using an AC voltmeter to check AC leakage.

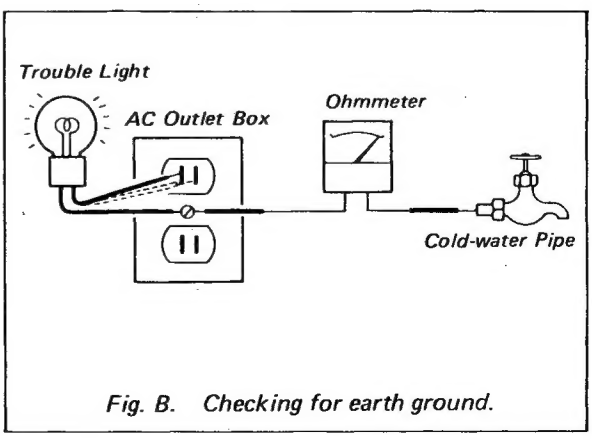


Fig. B. Checking for earth ground.

TABLE OF CONTENTS

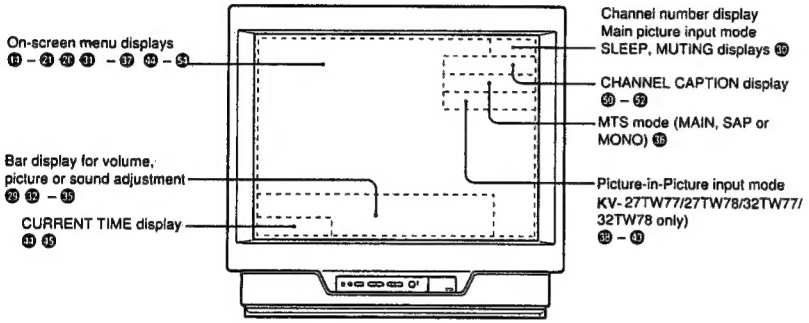
SECTION 1
GENERAL

The operating instructions mentioned here are partial abstracts from the Operating Instruction Manual. The page numbers of the Operating Instruction Manual remein as in the manual.

1-1. LOCATING THE CONTROLS

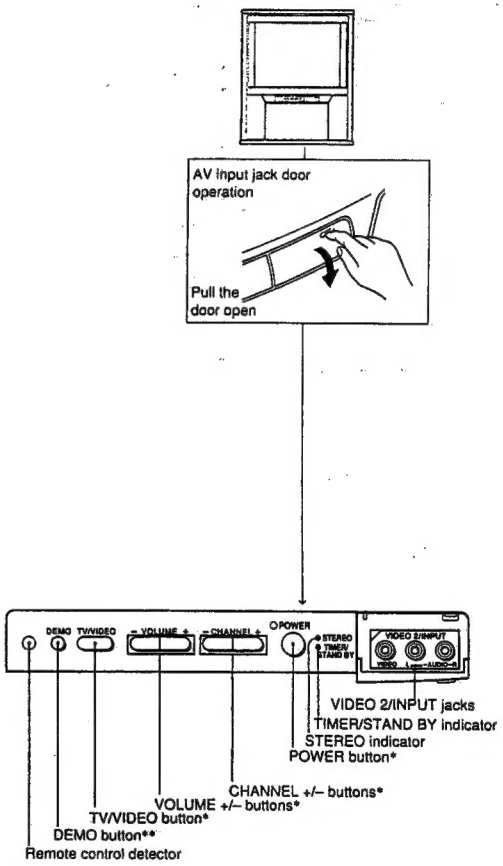
Screen Displays

For details, see the pages indicated by the numbered black circles ●.



Front Panel

KV-27TW77 KV-32TW77
KV-27TW78 KV-32TW78

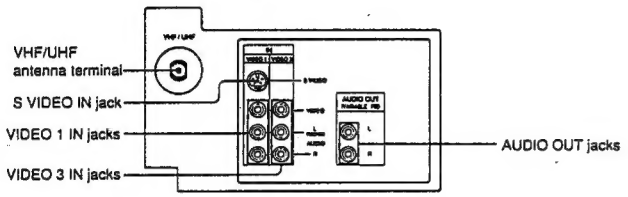


* Buttons with the same function are also located on the Remote Commander (pp. 10 – 11).

** If you press this button, functions and menues are displayed one by one. Press any button to stop DEMO.

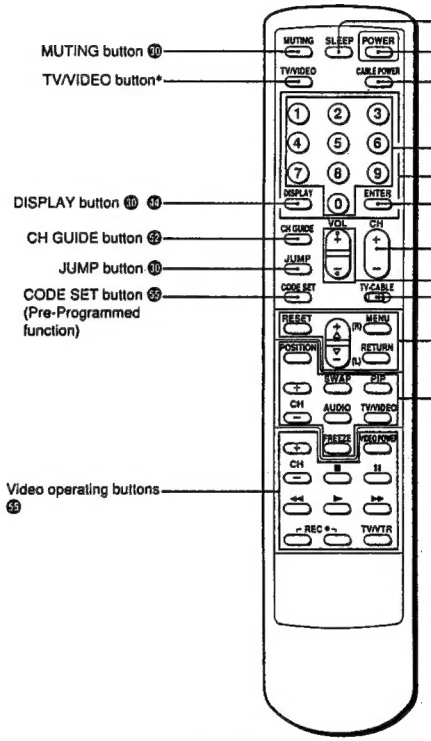
Rear Panel

KV-27TW77 KV-27TW78
KV-32TW77 KV-32TW78



Remote Commander

For details, see the pages indicated by the numbered black circles ●.



RM-Y118: KV-27TS36 KV-32TS36
KV-32TS46 KV-27TW77
KV-27TW78 KV-32TW77
KV-32TW78
(RM-Y117: KV-27TS32)

* Buttons with the same function are also located on the TV (p. 7).
** Buttons not included on RM-Y117

Note

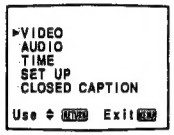
If the TV/CABLE selector is set to CABLE, the Remote Commander is able to control a connected cable box, not the TV. Set the selector to TV to control the TV set with the Remote Commander (You can use POWER button at any case).

1-2. USING THE ON-SCREEN MENUS

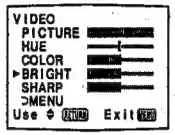
The following flow chart shows the different levels of on-screen menus that you can use to make various adjustments and settings. See the indicated pages for instructions on using each feature.

For picture quality adjustment

Main menu



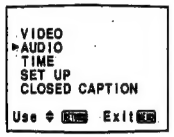
VIDEO menu (pp. 32–33)



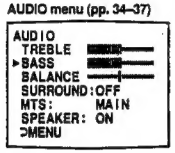
Adjustment bar

For sound quality adjustment

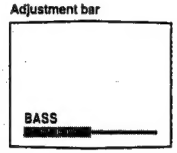
Main menu



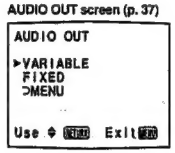
AUDIO menu (pp. 34–37)



Adjustment bar



AUDIO OUT screen (p. 37)

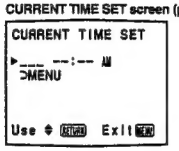


For time-related settings

Main menu

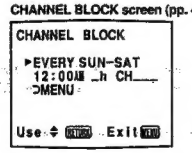
TIME menu

CURRENT TIME SET screen (pp. 44–45)



ON/OFF TIMER screen (pp. 46–47)

CHANNEL BLOCK screen (pp. 48–49)



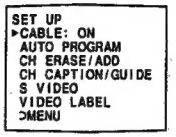
For language setting (p.16)
(KV-27TS32/2970RS only)

Main menu

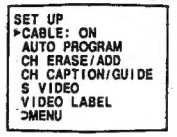
For presetting and other functions

Main menu

SET UP menu

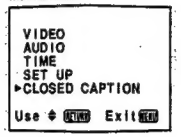


CABLE ON/OFF screen (p. 17)

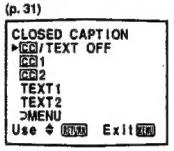


For closed caption setting

Main menu

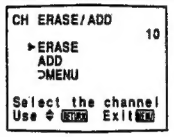


CLOSED CAPTION screen (p. 31)

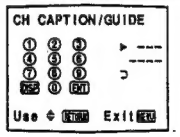


AUTO PROGRAM screen (p. 18)

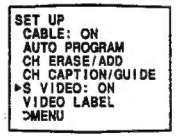
CHANNEL ERASE/ADD screen (pp. 19–21)



CHANNEL CAPTION/GUIDE screen (pp. 50–51)



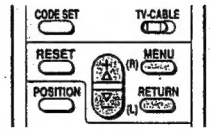
S VIDEO ON/OFF screen (p. 28)



VIDEO LABEL screen (pp. 53–54)

Navigating through the Menus

Remote Commander



To display the main menu
Press MENU.

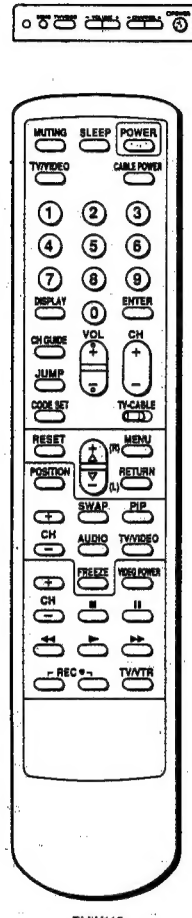
To return to the previous menu
Press △+ or ▽– to select "⊃ MENU."
Then press RETURN.

To return to the main menu
Repeat the above, until you reach the main menu.

To return to the normal screen
Press MENU on the Remote Commander.

Note

The menus disappear automatically if you do not press a button within 90 seconds.
The menu you cannot select appears in black.



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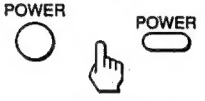
To return to the normal screen
Press MENU.

Changing the Menu Language (KV-27TS32/2970RS only)

The menu language is factory-set to ENGLISH. Follow these instructions to change the menu language to Spanish or back to English.

1 Press POWER on the TV or the Remote Commander to turn the TV on.



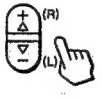
2 Press MENU.
The main menu appears.


```
▸VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
 ENGLISH
Use ≑ RETURN Exit MENU
```

3 Press Δ+ or ∇– to select ENGLISH.
Then press RETURN.


```
 VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
 ENGLISH
Use ≑ RETURN Exit MENU
```

4 Press Δ+ or ∇– to select language.
Each time you press Δ+ or ∇–,
ESPAÑOL and ENGLISH menus appear.




```
 VIDEO
 AUDIO
 HORA
 AJUSTES
 CLOSED CAPTION
 ESPAÑOL
Usar ≑ RETURN Salir MENU
```

```
 VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
 ENGLISH
Use ≑ RETURN Exit MENU
```

Note

Certain parts of the ESPAÑOL menus remain in English.

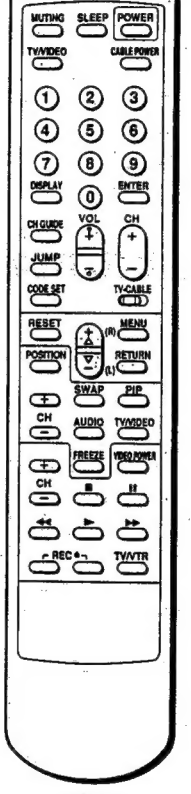
5 Press RETURN.
The language is selected.


```
 VIDEO
 AUDIO
 HORA
 AJUSTES
 CLOSED CAPTION
▸ESPAÑOL
Usar ≑ RETURN Salir MENU
```

Spanish menu

1-3. TURNING THE CABLE MODE ON OR OFF

All of the controls are on the Remote Commander.



RM-Y118

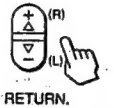
To return to the normal screen
Press MENU.

If you have cable connected to your TV (pp.12–13), follow the steps below to turn the cable connection on or off. CABLE is preset to ON when you use your TV for the first time. Then turn CABLE to OFF to preset or watch VHF or UHF channels (pp.18-21 and 29).

1 Press MENU.
The main menu appears.


```
▸VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
Use ≑ RETURN Exit MENU
```

2 Press Δ+ or ∇– to select SET UP.




```
 VIDEO
 AUDIO
 TIME
▸SET UP
 CLOSED CAPTION
Use ≑ RETURN Exit MENU
```

Press RETURN.
The SET UP menu appears, and the cursor points to "CABLE".


```
SET UP
▸CABLE: ON
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO
 VIDEO LABEL
>MENU
```

Note

If the CABLE display appears in black, the TV is in VIDEO mode and you cannot select CABLE. Press TV/VIDEO to change to TV mode.

3 Press RETURN again.


```
SET UP
▸CABLE: ON
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO
 VIDEO LABEL
>MENU
```

Press Δ+ or ∇– to select ON or OFF alternately.

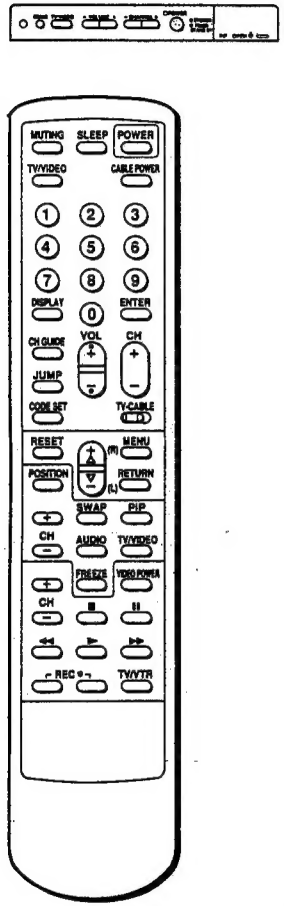
```
SET UP
 CABLE: ON
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO
 VIDEO LABEL
>MENU
```

↔

```
SET UP
 CABLE: OFF
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO
 VIDEO LABEL
>MENU
```

Press RETURN.
The setting is completed.

1-4. PRESETTING TV CHANNELS



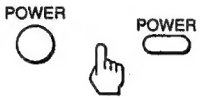
RM-Y118

Channels that can be received on this TV:

VHF	UHF	Cable
2-13	14-69	1-125

Presetting TV Channels Automatically

1 Press POWER on the TV or the Remote Commander to turn the TV on.



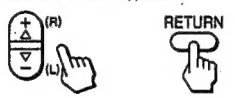
2 Set the cable connection on or off, depending on if you want to preset cable or VHF/UHF channels.
(Follow the steps in "Turning the Cable Mode On or Off", p.17)

If "VIDEO" is displayed on the screen, press the TV/VIDEO button on the TV or the Remote Commander so that a channel number appears.

3 Press MENU.
The main menu appears.

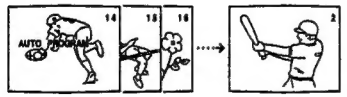

```
▸VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
Use ≑ RETURN Exit MENU
```

4 Press Δ+ or ∇– to select SET UP.
Then press RETURN.
The SET UP menu appears.




```
SET UP
▸CABLE: ON
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO
 VIDEO LABEL
 >MENU
```

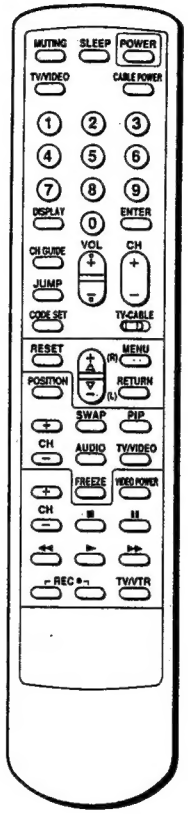
5 Press Δ+ or ∇– to select AUTO PROGRAM.
Then press RETURN.




```
SET UP
 CABLE: ON
▸AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO
 VIDEO LABEL
 >MENU
```

"AUTO PROGRAM" appears on the screen and receivable channels (other than the channels already preset) are preset in numerical sequence. The channels previously preset will not remain in the TV's memory.
When no more channels can be found, the programming stops and the lowest numbered channel is displayed.

To erase unnecessary channels, or to add channels that could not be preset automatically because their signal was too weak, follow the steps in "Erasing Unnecessary Channels — CHANNEL ERASE" (pp.19–20) and "Presetting Only Desired Channels — CHANNEL ADD" (p. 21).



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Erasing Unnecessary Channels—CHANNEL ERASE

Use this feature to erase unnecessary TV channels, so that when you press CH +/–, the channel(s) are skipped.

1 Press MENU.
The main menu appears.


```
▸VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
Use ≑ RETURN Exit MENU
```

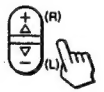
2 Press Δ+ or ∇– to select SET UP.


```
 VIDEO
 AUDIO
 TIME
▸SET UP
 CLOSED CAPTION
Use ≑ RETURN Exit MENU
```

Press RETURN.
The SET UP menu appears.


```
SET UP
▸CABLE: ON
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO
 VIDEO LABEL
 >MENU
```

3 Press Δ+ or ∇– to select CH ERASE/ADD.




```
SET UP
 CABLE: ON
 AUTO PROGRAM
▸CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO
 VIDEO LABEL
 >MENU
```

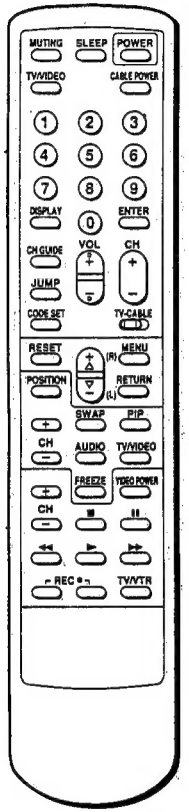
Press RETURN.
The CH ERASE/ADD screen appears, and the cursor points to "ERASE".


```
CH ERASE/ADD
                10
 ▸ERASE
  ADD
 >MENU

Select the channel
Use ≑ RETURN Exit MENU
```

Note

If CH ERASE/ADD display appears in black, the TV is in video mode and you cannot select CH ERASE/ADD.
Press TV/VIDEO to change to TV mode.



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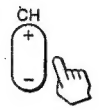
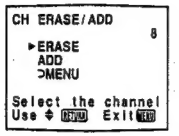
To return to the normal screen
Press MENU.

Note

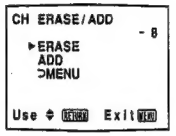
When you erase a VHF or UHF channel, the cable TV channel with the same number is also erased, and vice versa.

4 Press the CH +/– button to select the channel you want to erase.
For example, to erase channel 8, press CH +/– until 8 appears.





Press RETURN.
A "–" sign appears in front of the channel number display, indicating that the channel is erased from the channel scan memory.



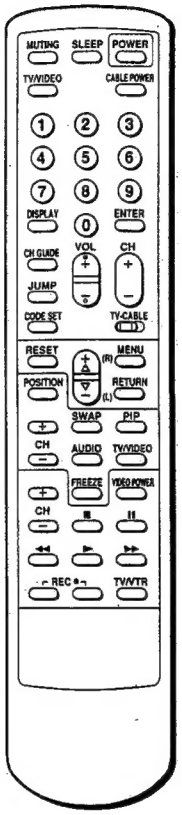
The next time you press the CH +/– buttons, channel 8 will be skipped.

To erase other channels
Repeat step 4.

Cable TV channel chart*
Cable TV systems use letters or numbers to designate channels. To tune in a channel, refer to the chart below.

Number on this TV	Corresponding cable TV channel	Number on this TV	Corresponding cable TV channel
1	A-8	33	T
5	A-7	34	U
6	A-6	35	V
14	A	36	W
15	B	37	W+1
16	C	38	W+2
17	D	39	W+3
18	E	⋮	⋮
19	F	93	W+57
20	G	94	W+58
21	H	95	A-5
22	I	96	A-4
23	J	97	A-3
24	K	98	A-2
25	L	99	A-1
26	M	100	W+59
27	N	101	W+60
28	O	102	W+61
29	P	⋮	⋮
30	Q	123	W+82
31	R	124	W+83
32	S	125	W+84

* This designation of cable TV channels conforms to the EIA/NCTA recommendation. Check with your local cable TV company for more complete information on the available channels.



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To return to the normal screen
Press MENU.

Note

If you add a VHF or UHF channel, the cable TV channel with the same number is also added, and vice versa.

Presetting Only Desired Channels—CHANNEL ADD

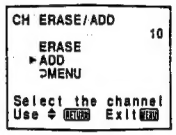
Use this feature to add channels one by one to the channel scan memory.

1-3 (Follow steps 1–3 in "Erasing Unnecessary Channels—CHANNEL ERASE," p.19.)

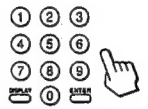
Note

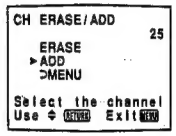
If the CH ERASE/ADD display appears in black, the TV is in video mode and you cannot select CHANNEL ERASE/ADD.
Press TV/VIDEO to change to TV mode.

4 Press △ + or ▽ – to select ADD.

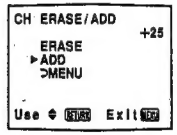


5 Press 0–9 and ENTER to select the channel you want to add.
For example, to add channel 25, press 2, 5 and ENTER.





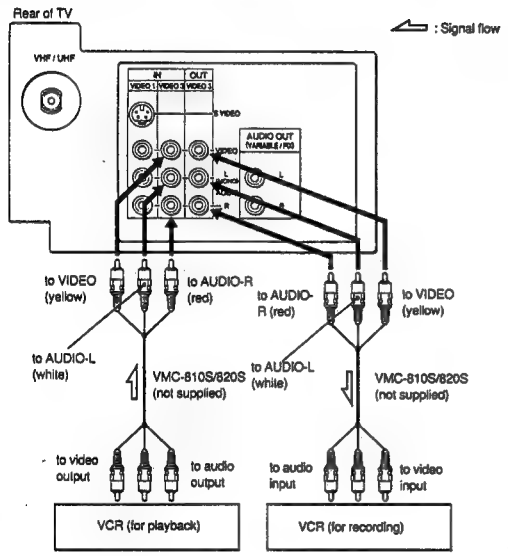
Press RETURN.
A "+" sign appears in front of the channel number display, indicating that the channel is added to the channel scan memory.



To add other channels
Repeat step 5.

1-5. CONNECTING OTHER EQUIPMENT

Connecting two VCRs for tape editing (KV-27TS32 only)



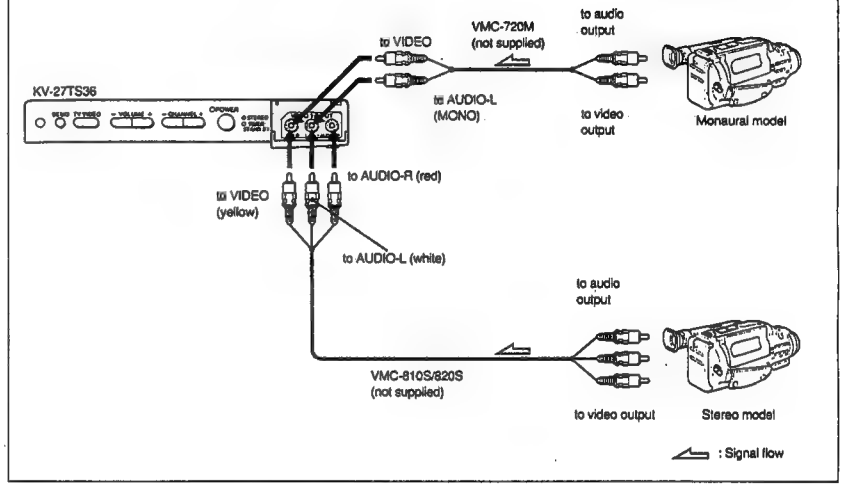
Watching a different image while duplicating

You can duplicate your recorded tapes by connecting two VCRs.
The VIDEO 3 OUT jacks only output the signal from the VIDEO 3 IN jacks. Connect a VCR for playback to VIDEO 3 IN jacks, and a VCR for recording to the VIDEO 3 OUT jacks. You can watch a TV program or images from VIDEO 1 IN or VIDEO 2 IN during duplicating.

To watch a different input image
Press TV/VIDEO on the TV or on the Remote Commander to select the input image you want to watch.

Connecting camcorders (except for KV-27TS29/2970RS)

Playing back recorded tapes

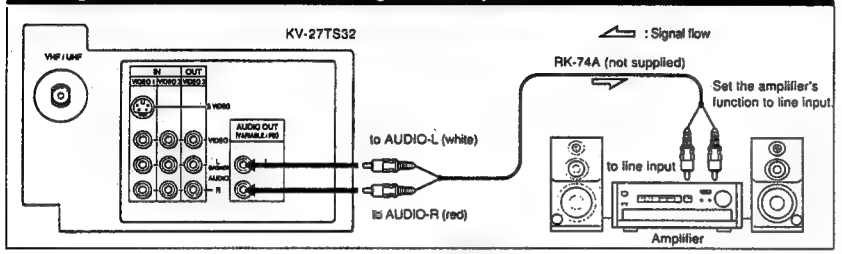


Preparing for use

Same as p. 23.

Audio System

Listening to TV or connected VCR sound through an audio system



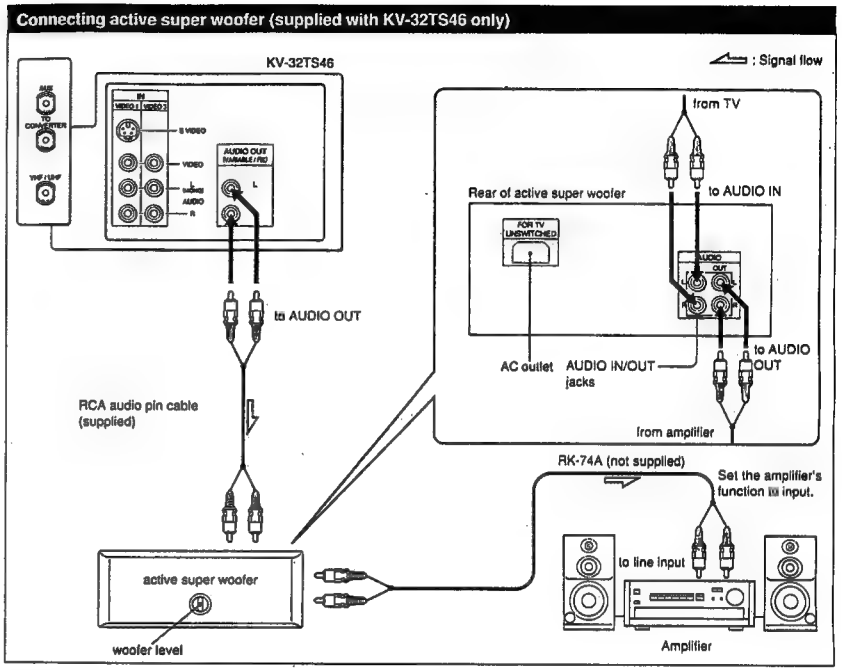
Preparing for use

Display the mode set menu and set SPEAKER to OFF to cut off the TV speaker sound (p. 37), and listen to the TV's sound solely through the audio system speakers.

Note

By setting AUDIO OUT variable, you can adjust the bass, treble and balance, or select surround or an MTS (Multichannel TV Sound) mode, using the on-screen menus (pp. 34–36).

Connecting active super woofer (supplied with KV-32TS46 only)



Preparing for use

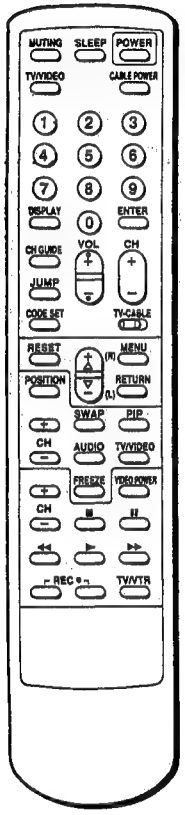
Same as p. 26.

Notes

- You should only connect the KV-32TS46 to the AC outlet on the active super woofer.
- To make the active super woofer stable, attach the felt feet (supplied) to the bottom.
- When you use the dedicated stand (not supplied), remove the rear panel of the stand.

Active Super Woofer Specification

Input : 500 mVrms (100% modulation)
Output : 500 mVrms (100% modulation)
Impedance: 47 kilohms
Power consumption:
9 W (100 Hz)
Dimensions: 435 × 165 × 164 mm (W × H × D)
(17¼ × 6½ × 6½ in.)
Weight : 3.9 kg
(8 lbs 10 oz)



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To return to the normal screen
Press MENU.

Note

If you set S VIDEO to ON, the TV automatically receives S video signals whenever a VCR with S video is connected.

Watching a Video with Your S Video-Equipped VCR (except for KV-27TS29/2970RS)

Use this feature to set S VIDEO to ON or OFF depending on the kind of video equipment you have connected to the TV. For instructions on connecting video equipment, see pp.22–25.

Note

If the TV is in TV, VIDEO 2 or VIDEO 3 mode, the S VIDEO display appears in black and cannot be selected.
Press TV/VIDEO to change to VIDEO 1 mode.

1 Press MENU.
The main menu appears.

MENU

```
▸VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
Use ◆ ENTER  Exit MENU
```

2 Press △+ or ▽– to select SET UP.

(R) (L)

```
 VIDEO
 AUDIO
 TIME
▸SET UP
 CLOSED CAPTION
Use ◆ ENTER  Exit MENU
```

Press RETURN.
The SET UP menu appears.

RETURN

```
SET UP
▸CABLE: ON
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO: ON
 VIDEO LABEL
 >MENU
```

3 Press △+ or ▽– to select S VIDEO.
Then press RETURN.

(R) (L) RETURN

```
SET UP
 CABLE: ON
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
▸S VIDEO: ON
 VIDEO LABEL
 >MENU
```

Press △+ or ▽– to select ON or OFF alternately.

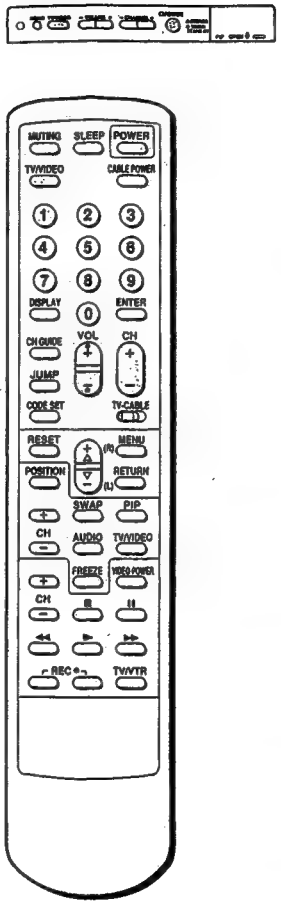
```
SET UP
 CABLE: ON
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO: ON
 VIDEO LABEL
 >MENU
```

↔

```
SET UP
 CABLE: ON
 AUTO PROGRAM
 CH ERASE/ADD
 CH CAPTION/GUIDE
 S VIDEO: OFF
 VIDEO LABEL
 >MENU
```

Press RETURN.
The setting is completed.

1-6. WATCHING TV PROGRAMS



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1 Press POWER on the TV or the Remote Commander to turn the TV on.
The TIMER/STAND BY indicator blinks until the picture appears.

POWER POWER

2 Turn the cable mode on or off to select the type of channel you want to watch, VHF/UHF or cable TV.
(Follow the steps in "Turning the Cable Mode On or Off," p. 17.)

If "VIDEO" or "S VIDEO" is displayed on the screen, press the TV/VIDEO button on the TV or on the Remote Commander so that the channel number appears.

3 Select a channel in one of the following two ways:

To scan the preset channels* in numerical sequence
Press CH +/–.

CH

* For more information on presetting channels, see pp. 18 – 21.

To select a channel directly
Press 0 – 9 and ENTER.
For example, to select channel 14, press 1, 4 and ENTER.

4 Press VOL +/– to adjust the volume.

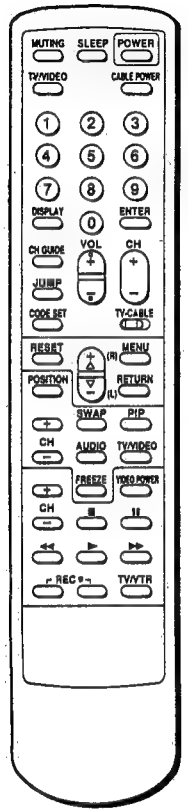
VOL

Press + to increase the volume.
Press – to decrease the volume.

The display will disappear automatically after 3 seconds.

To turn off the TV
Press POWER on the TV or the Remote Commander again.

1-7. USING CONVENIENT FEATURES



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Muting the Sound — MUTING

Press MUTING.
The display "MUTING" will appear on the screen.

MUTING

To restore the sound
Press MUTING again, or press VOL +.

Keeping the Displays On-Screen — DISPLAY

To display the channel
Press DISPLAY.
All the existing displays appear: channel number, channel caption (if set), MTS mode ("SAP" only), window picture input mode and the current time ("AM" or "PM" disappears after about three seconds).

DISPLAY

To cancel the display
Press DISPLAY again.
The channel display will disappear.

Using the Sleep Timer — SLEEP

The sleep timer turns off the TV automatically after the amount of time you select.

Press SLEEP.
Each time you press SLEEP, the time increments "30", "60", "90" and "OFF" mode appear in sequence.

SLEEP

SLEEP 30
SLEEP 60
SLEEP 90
SLEEP OFF

The SLEEP display appears about one minute before the TV turns off.

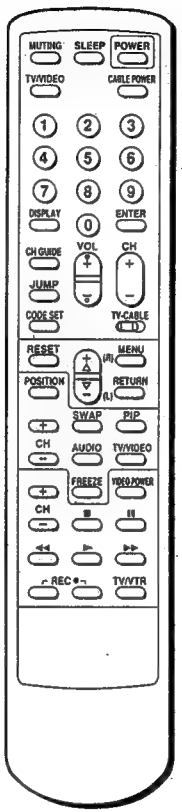
To cancel the setting
Press SLEEP until "OFF" mode appears.
The "SLEEP OFF" display appears for about three seconds.
OR
Turn the TV off.
The sleep timer setting is cancelled.

Switching Quickly Between Two Channels—JUMP

Press JUMP once to recall the channel you were watching previously. Press JUMP again to switch back. Use this feature to keep track of two programs alternately.

JUMP

1-8. USING CLOSED CAPTION



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1 Press MENU.
The main menu appears.

MENU

```
▸VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
Use ◆ RETURN  Exit MENU
```

2 Press Δ+ or ∇– to select CLOSED CAPTION.
Then press RETURN.
The CLOSED CAPTION screen appears.

(R) (L)

RETURN

```
CLOSED CAPTION
▸CC/TEXT OFF
 CC1
 CC2
 TEXT1
 TEXT2
 >MENU
Use ◆ RETURN  Exit MENU
```

3 Press Δ+ or ∇– to select closed caption mode.

(R) (L)

Select CC1 or CC2 to view Captions. A Caption is a printed version of the dialogue or sound effects of a program. (The mode should be set to CC1 for most programs.)

```
CLOSED CAPTION
 CC/TEXT OFF
▸CC1
 CC2
 TEXT1
 TEXT2
 >MENU
Use ◆ RETURN  Exit MENU
```

Select TEXT1 or TEXT2 to view Text. Text is information that is presented using the half to full television screen. It is usually not related to the program.

```
CLOSED CAPTION
 CC/TEXT OFF
 CC1
 CC2
▸TEXT1
 TEXT2
 >MENU
Use ◆ RETURN  Exit MENU
```

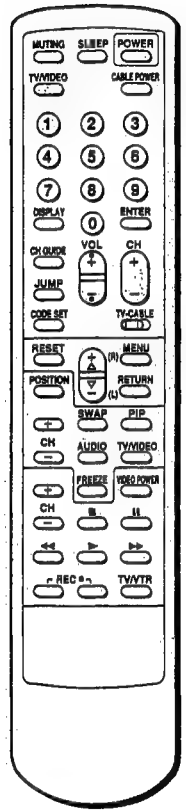
Select CC/TEXT OFF if you do not want to use the CLOSED CAPTION mode.

```
CLOSED CAPTION
▸CC/TEXT OFF
 CC1
 CC2
 TEXT1
 TEXT2
 >MENU
Use ◆ RETURN  Exit MENU
```

Press RETURN.
The setting is completed.

RETURN

1-9. WATCHING TWO PICTURES AT ONCE (PICTURE-IN-PICTURE)



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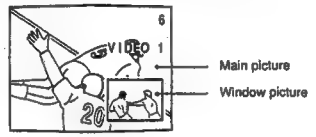
Note

To operate your VCR with the supplied Remote Commander, See "Using the Pre-Programmed Remote Commander", pp. 55–57.

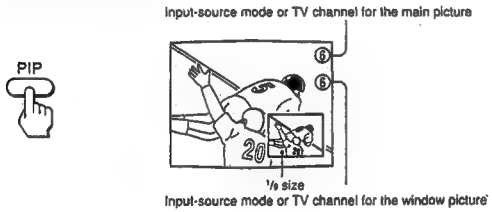
You can watch both the main picture and a window picture simultaneously by using the Picture-in-Picture (PIP) function.
Model KV-32TS46 is equipped with two-tuner PIP, allowing you to watch two TV channels at once.
Other models are equipped with one-tuner PIP. To watch two different TV channels, you must first connect a VCR to the TV, to watch a second TV channel through the VCR tuner. (See"Connecting Other Equipment", pp. 22–27.)



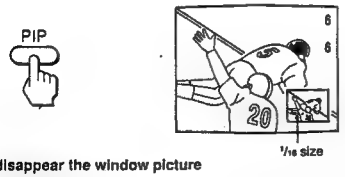
Picture-in-Picture special features
When watching the main picture and a window picture, you can:
- Swap the main and window pictures (SWAP).
- Change the position of the window picture (POSITION).
- Display a still picture as a window (FREEZE).
- Choose the sound from the main or window picture (AUDIO).

Displaying a window picture—PIP

Press PIP to display a window picture



Press PIP again to display a smaller window picture

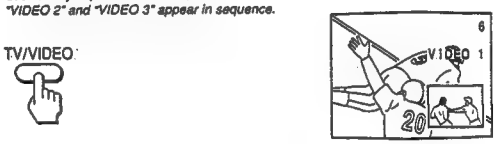


To disappear the window picture
Press PIP once more.

Changing the window picture input mode

1 Press PIP to display a window picture.

2 Press TV/VIDEO in the Picture-in-Picture control area to select the input mode.
Each time you press TV/VIDEO, "TV", "VIDEO 1", "VIDEO 2" and "VIDEO 3" appear in sequence.



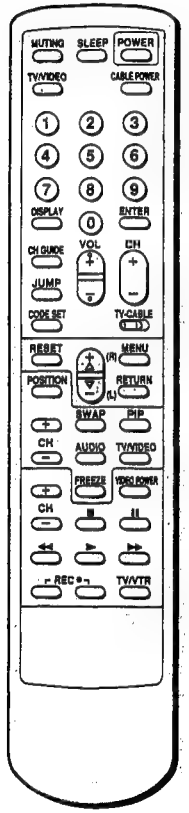
A window picture will appear in the same input mode as the last time you used PIP.

To receive the window picture sound
Press AUDIO.
The ♪ display appears for a few seconds, indicating that the window picture sound is being received.

To restore the main picture sound
Press AUDIO again.

Notes

- If the main picture is not receiving an image, the window picture may be in black and white.
- When you turn PIP on or when you turn the TV on with PIP mode on the window picture will appear at the bottom right of the screen.
- The window picture may be affected by the condition of the main picture.
- The window picture sound is also output from the VARIABLE/FIX AUDIO OUT jacks.



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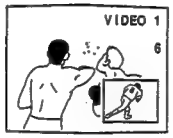
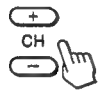
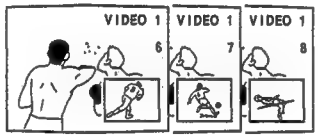
Changing TV channels in the window picture

1 Press PIP to display a window picture.



2 Press CH +/– in the PIP control area.

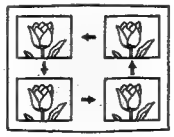




Changing the position of the window picture—POSITION

1 Press PIP to display a window picture.

2 Press POSITION.
Each time you press POSITION, the window picture will move counterclockwise on the screen, as illustrated below.

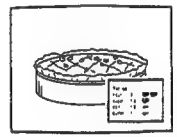


Displaying a still picture — FREEZE

Use the FREEZE function to display a still picture as a window. This function is useful when you want to write down a recipe from a cooking program, a displayed address or a phone number and so on.

1 Press PIP to display a window picture.

2 Press FREEZE.
The window picture image remains still on the screen.

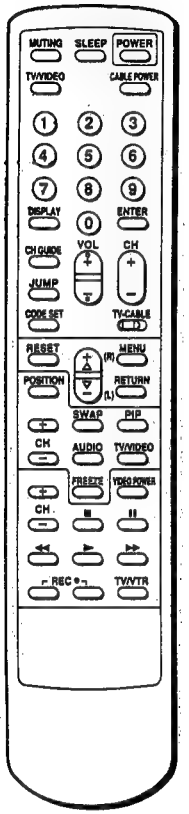


To restore the normal picture
Press FREEZE again.

Swapping the main and window pictures — SWAP

1 Press PIP to display a window picture.

2 Press SWAP.
Each time you press SWAP, the images from the main and window pictures switch places.



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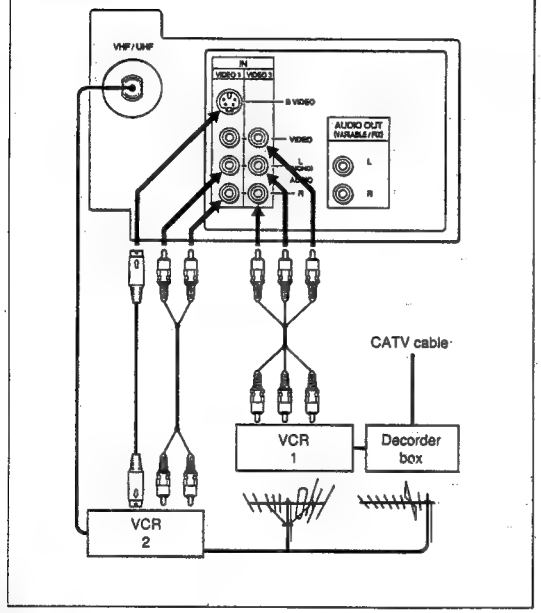
Displaying a pay cable TV channel as a window picture

To display a pay cable TV channel as a window picture, connect your decorder box as illustrated below.

Connection



Note

The channels being received through the AUX terminal cannot be displayed as a window picture. (KV-32TS46 only)

After making the connections, turn the cable mode on by following the steps "Turning the Cable Mode On or Off", p. 17. Then continue with steps below.

1 Press PIP to display a window picture.

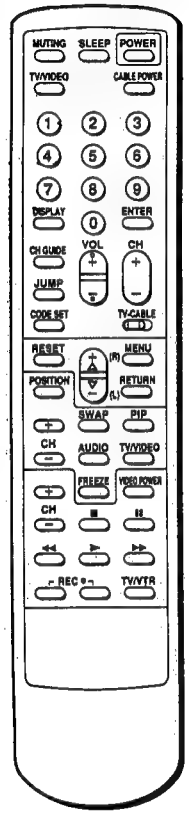
2 Press TV/VIDEO in the Picture-in-Picture control area to select the input mode.

Each time you press TV/VIDEO, "TV", "VIDEO 1", "VIDEO 2" and "VIDEO 3" appear in sequence.

3 Put your VCR on an inactive channel (CH 3 or 4).

4 Change pay cable TV channels with the decorder box.

1-10. USING THE TIMER-ACTIVATED FUNCTIONS



RM-Y118

Setting the Clock—CURRENT TIME SET

Follow these instructions to set the current time. The correct time must be set in order to use the timer-activated functions (ON/OFF TIMER, CHANNEL BLOCK).

EXAMPLE: Set the time to 3:15 PM, Monday.

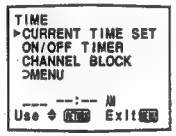
1 Press MENU.
The main menu appears.

MENU

2 Press △+ or ▽– to select TIME.

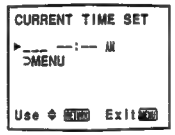
Press RETURN.
The TIME menu appears, and the cursor points to "CURRENT TIME SET".

RETURN



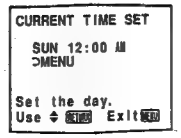
3 Press RETURN.
The CURRENT TIME SET screen appears.

RETURN



4 Press RETURN again.
"Set the day." appears on the screen.

RETURN



5 Press △+ or ▽– to set the day.
Each time you press △+ or ▽–, the day changes consecutively.

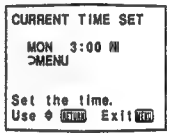
Press RETURN.
"Set the time." appears on the screen.

RETURN

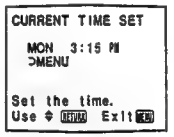
6 Press △+ or ▽– to set the hour.
Each time you press △+ or ▽–, the hour changes starting with "12:00 AM."

Press RETURN.

RETURN



7 Press △+ or ▽– to set the minutes.
Each time you press △+ or ▽–, the minutes change in sequence.



Press RETURN.
The setting is completed, and the clock starts.

RETURN

To reset the time
Press RESET while in the CURRENT TIME screen, and repeat steps 4–7.

To display the time
Press DISPLAY.

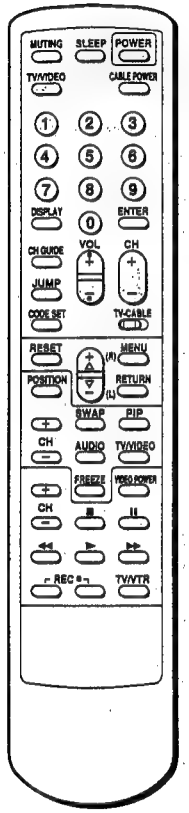
To return to the normal screen
Press MENU.

Notes

- The internal clock of this TV operates on a 12-hour cycle. If a 24-hour cycle number (for instance, 13:00) is entered, it will be cleared when you press RETURN.

  12:00 AM stands for midnight.
  12:00 PM stands for noon.

- All the settings including CURRENT TIME SET will be erased if you unplug the TV or a power failure occurs. Reset the current time by following steps 1–7.



RM-Y118

Setting the ON/OFF TIMER

With this function you can set your favorite program to appear on the screen at the time that you set.

EXAMPLE: Set the timer to turn on the TV every Monday through Friday at 3:15 PM for 2 hours, on channel 21.

1 Press MENU.
The main menu appears.

MENU

```
▸VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
Use ≑ RETURN Exit MENU
```

2 Press Δ+ or ∇– to select TIME.
Then press RETURN.
The TIME menu appears.

(R) (L) RETURN

```
TIME
▸CURRENT TIME SET
 ON/OFF TIMER
 CHANNEL BLOCK
 >MENU

 MON  3:15 PM
Use ≑ RETURN Exit MENU
```

3 Press Δ+ or ∇– to select ON/OFF TIMER.
Then press RETURN.
The ON/OFF TIMER screen appears.

(R) (L) RETURN

```
ON/OFF TIMER
▸EVERY SUN-SAT
 12:00AM _h CH___
 >MENU

Use ≑ RETURN Exit MENU
```

Note

If the ON/OFF TIMER display appears in black, the current time has not been set and you cannot select ON/OFF TIMER. To set the clock, see "Setting the Clock—CURRENT TIME SET", pp. 44–45.

4 Press RETURN again.
"Set the day." appears on the screen.

RETURN

```
ON/OFF TIMER
 EVERY SUN-SAT
 12:00AM _h CH___
 >MENU

Set the day.
Use ≑ RETURN Exit MENU
```


5 Press Δ+ or ∇– to set the day.
Each time you press Δ+ or ∇–, the days of the week change as shown in Fig. 1.
Then press RETURN.
"Set the time." appears on the screen.

(R) (L) RETURN

```
ON/OFF TIMER
 EVERY MON-FRY
 12:00AM _h CH___
 >MENU

Set the time.
Use ≑ RETURN Exit MENU
```

6 Press Δ+ or ∇– to set the hour that you want the TIMER to start.
Each time you press Δ+ or ∇–, the hour changes in sequence.
Then press RETURN.

(R) (L) RETURN

```
ON/OFF TIMER
 EVERY MON-FRY
 3:00PM _h CH___
 >MENU

Set the time.
Use ≑ RETURN Exit MENU
```

7 Press Δ+ or ∇– to set the minutes.
Each time you press Δ+ or ∇–, the minutes change in sequence.
Then press RETURN.
"Set the duration." appears on the screen.

(R) (L) RETURN

```
ON/OFF TIMER
 EVERY MON-FRY
 3:15PM _h CH___
 >MENU

Set the duration.
Use ≑ RETURN Exit MENU
```

8 Press Δ+ or ∇– to set the duration of time.
Each time you press Δ+ or ∇–, the duration changes from "1" to "6" in sequence.
Then press RETURN.
"Select the channel" appears on the screen.

(R) (L) RETURN

```
ON/OFF TIMER
 EVERY MON-FRY
 3:15PM 2h CH___
 >MENU

Select the channel
Use ≑ RETURN Exit MENU
```

9 Press Δ+ or ∇– to set the channel that you want the TV to tune in.
Each time you press Δ+ or ∇–, the channel number changes from 1 to 125 in sequence.

(R) (L)

```
ON/OFF TIMER
 EVERY MON-FRY
 3:15PM 2h CH 21
 >MENU

Select the channel
Use ≑ RETURN Exit MENU
```

Press RETURN.
The setting is completed, and the TIMER indicator on the front of the TV lights up.

RETURN

```
ON/OFF TIMER
▸EVERY MON-FRY
 3:15PM 2h CH 21
 >MENU

Use ≑ RETURN Exit MENU
```

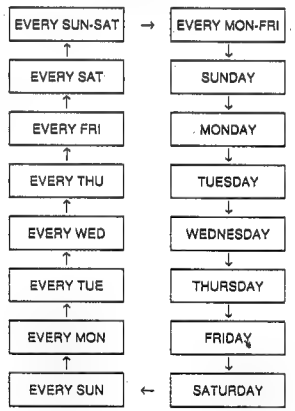
To clear the ON/OFF TIMER setting
Press RESET while in the ON/OFF TIMER screen.

To return to the normal screen
Press MENU.

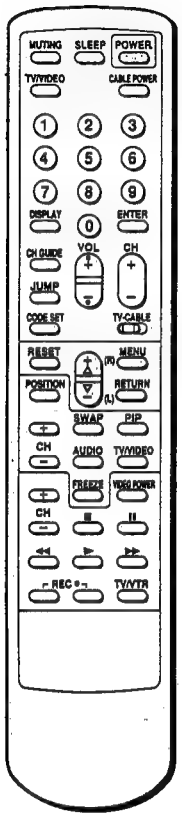
Notes

- While the TIMER is set, the TIMER indicator on the TV is on.
- One minute before the timer goes off, the "TV will turn off" display will appear on the screen.
- All the settings including ON/OFF TIMER will be erased if you unplug the TV or a power failure occurs. Reset the ON/OFF TIMER by following steps 1-9.
- If you have not set the clock correctly, the ON/OFF TIMER will not operate at the proper time. To set the clock, see "Setting the Clock–CURRENT TIME SET", pp. 44–45.

Fig. 1
Selecting the day(s) of the week
When you press Δ+, the days of the week appear in the following order.



(∇–: reverse order)



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Setting CHANNEL BLOCK

Use this function to block a channel from appearing on the screen during the time you specify. You can use this function to prevent children from watching undesirable programs.

EXAMPLE: Set CHANNEL BLOCK every Sunday at 8:45 PM for one hour, on channel 38.

1 Press MENU.
The main menu appears.

MENU

```
▸VIDEO
 AUDIO
 TIME
 SET UP
 CLOSED CAPTION
Use ◆ RETURN  Exit MENU
```

2 Press Δ+ or ∇– to select TIME.
Then press RETURN.
The TIME menu appears.

(R) (L) RETURN

```
TIME
▸CURRENT TIME SET
 ON/OFF TIMER
 CHANNEL BLOCK
 >MENU
 MON  3:15 PM
Use ◆ RETURN  Exit MENU
```

3 Press Δ+ or ∇– to select CHANNEL BLOCK.
Then press RETURN.
The CHANNEL BLOCK screen appears.

(R) (L) RETURN

```
CHANNEL BLOCK
▸EVERY SUN-SAT
 12:00AM _h CH___
 >MENU
Use ◆ RETURN  Exit MENU
```

Note

If the CHANNEL BLOCK display appears in black, the current time has not been set and you cannot select CHANNEL BLOCK. To set the clock, see "Setting the Clock—CURRENT TIME SET", pp. 44–45.

4 Press RETURN again.
"Set the day." appears on the screen.

RETURN

```
CHANNEL BLOCK
 EVERY SUN-SAT
 12:00AM _h CH___
 >MENU
Set the day.
Use ◆ RETURN  Exit MENU
```


5 Press Δ+ or ∇– to set the day.
Each time you press Δ+ or ∇–, the days of the week change as shown in Fig. 1.(See p. 47.)
Then press RETURN.
"Set the time." appears on the screen.

(R) (L) RETURN

```
CHANNEL BLOCK
 SUNDAY
 12:00AM _h CH___
 >MENU
Set the time.
Use ◆ RETURN  Exit MENU
```

6 Press Δ+ or ∇– to set the hour.
Each time you press Δ+ or ∇–, the hour changes in sequence.
Then press RETURN.

(R) (L) RETURN

```
CHANNEL BLOCK
 SUNDAY
 8:00PM _h CH___
 >MENU
Set the time.
Use ◆ RETURN  Exit MENU
```

7 Press Δ+ or ∇– to set the minutes.
Each time you press Δ+ or ∇–, the minutes change in sequence.
Then press RETURN.
"Set the duration." appears on the screen.

(R) (L) RETURN

```
CHANNEL BLOCK
 SUNDAY
 8:45PM _h CH___
 >MENU
Set the duration.
Use ◆ RETURN  Exit MENU
```

8 Press Δ+ or ∇– to set the duration of time that you want the TV remain blocked.
Each time you press Δ+ or ∇–, the duration changes from 1 to 6 in sequence.
Then press RETURN.
"Select the channel" appears on the screen.

(R) (L) RETURN

```
CHANNEL BLOCK
 SUNDAY
 8:45PM 1h CH___
 >MENU
Select the channel
Use ◆ RETURN  Exit MENU
```

9 Press Δ+ or ∇– to set the channel that you want to block.
Each time you press Δ+ or ∇–, the channel number changes from 1 to 125 in sequence.

(R) (L)

```
CHANNEL BLOCK
 SUNDAY
 8:45PM 1h CH 38
 >MENU
Select the channel
Use ◆ RETURN  Exit MENU
```

Press RETURN.
The setting is completed.

RETURN

```
CHANNEL BLOCK
▸SUNDAY
 8:45PM 1h CH 38
 >MENU
Use ◆ RETURN  Exit MENU
```

If you select a channel which has been blocked, the message of "BLOCKED" appears.

```
BLOCKED
```

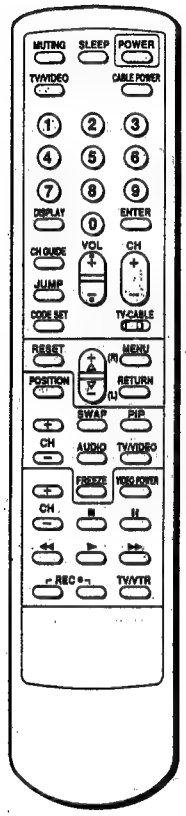
To clear the BLOCK setting
Press RESET while in the CHANNEL BLOCK screen.

To return to the normal screen
Press MENU.

Notes

- If you set a new CHANNEL BLOCK by following steps 1-9, the original setting will be erased.
- If you have not set the clock correctly, CHANNEL BLOCK will not operate at the proper time. To set the clock, see "Setting the Clock—CURRENT TIME SET", pp. 44–45.

1-11. CUSTOMIZING THE SCREEN DISPLAY



RM-Y118

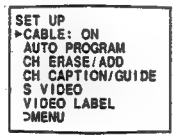
Setting Channel Captions — CH CAPTION

Use this feature to caption up to 12 channel number displays with the matching channel call letters.

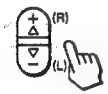
EXAMPLE: Caption channel 20 with ESPN at the caption position number 4.

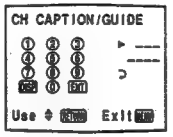
1 Press MENU.
The main menu appears.

2 Press Δ+ or ∇– to select SET UP.
Then press RETURN.
The SET UP menu appears.



3 Press Δ+ or ∇– to select CH CAPTION/GUIDE.
Then press RETURN.
The CH CAPTION/GUIDE screen appears.

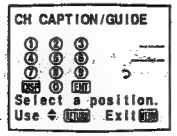




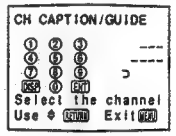
Note

If the CH CAPTION display appears in black, the TV is in video mode and you cannot select CH CAPTION/GUIDE. Press TV/VIDEO to change to TV mode.

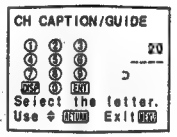
4 Press RETURN again.
"Select a position." appears on the screen.



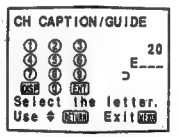
5 Press Δ+ or ∇– to select a caption position number.
Each time you press Δ+ or ∇–, the caption position number is marked in sequence.
Then press RETURN.
"Select the channel" appears on the screen.



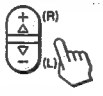
6 Press Δ+ or ∇– to select the channel you want to caption.
Each time you press Δ+ or ∇–, the channel number changes from 1 to 125.
Then press RETURN.
"Select the letter." appears on the screen.

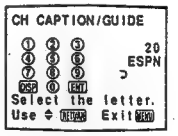


7 Press Δ+ or ∇– to select the first letter.
Each time you press Δ+ or ∇–, "0-9", "A-Z", "&", "/", "-" and "_(blank space)" appear in sequence.
Then press RETURN.

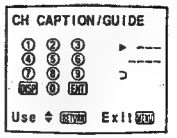


8 Repeat step 7 to select each remaining letter.
(For a 3-letter caption, leave a space by pressing RETURN only.)





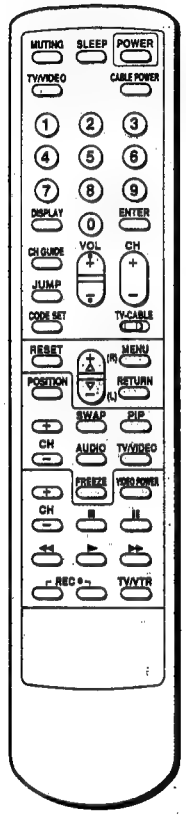
9 Press RETURN.
The setting is completed.



To caption other channels
Repeat steps 4-9.

To erase unneeded captions
Call the caption setting screen by following steps 1–5, and press RESET.

To return to the normal screen
Press MENU.



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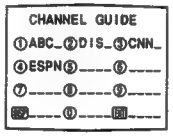
Viewing the Captioned Channels — CH GUIDE

Use this feature to display the captions you set, and to select a channel directory for viewing.

1 Press CH GUIDE.

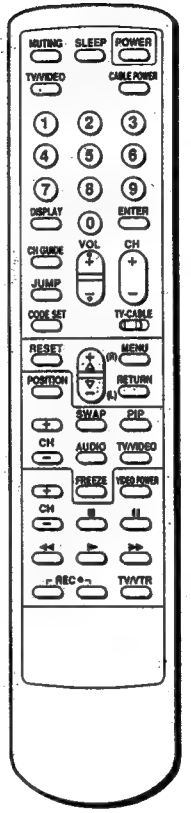
A directory appears, corresponding to the directory keys on the Remote Commander.

CH GUIDE



To cancel the CHANNEL GUIDE screen
Press CH GUIDE again.

2 Press the directory key of the channel you want to watch.



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To return to the normal screen
Press MENU.

4 Press Δ+ or ∇– to select the input mode you want to label.

Press RETURN.

5 Press Δ+ or ∇– to select VHS.

Each time you press Δ+, the label changes:

VIDEO 1
VIDEO 1 → S VIDEO → BETA → 8 mm → VHS → LD

VIDEO 2
VIDEO 2 → BETA → 8 mm → VHS → LD

VIDEO 3
VIDEO 3 → BETA → 8 mm → VHS → LD

(∇–: reverse order)

Press RETURN.

To label other input modes
Repeat steps 4–5.

1-12. USING THE PRE-PROGRAMMED REMOTE COMMANDER

Manufactures and Code Numbers (VCR/video disc player)

Manufacturer	Code number
SONY	01, 02, 03, 04
CANON	05
EMERSON	22, 30, 33
FISHER	10, 11, 12, 15
FUNAI	29
GENERAL ELECTRIC	05, 08
GOLDSTAR	25
HITACHI	07, 08
JVC	16
MAGNAVOX	05, 06, 09
MITSUBISHI	18, 19, 26, 27
MULTITECH	29
NEC	16, 23, 31
PANASONIC	05, 06
PHILCO	05, 06
PHILIPS	05, 06, 09
QUASAR	05, 06
RCA	07, 08
SAMSUNG	24, 32
SANYO	11, 15
SCOTT	21
SHARP	13, 14
SHINTOM	34
SYLVANIA	05, 06, 09
SYMPHONIC	29
TEKNIKA	28, 29
TOSHIBA	20, 21
TOTE VISION	25
ZENITH	17

The code numbers for Sony equipment are assigned as follows:

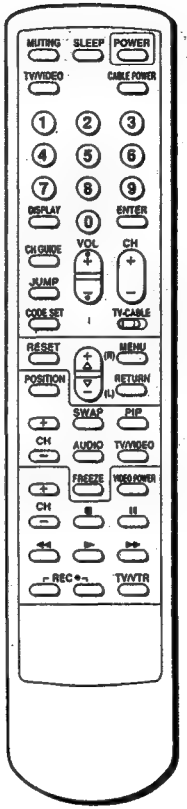
01 ..... Beta, ED Beta VCR
02 ..... 8 mm VCR
03 ..... VHS VCR
04 ..... Video disc player

Notes

- If more than one code number is listed for manufacturers other than Sony, try entering them one by one, until you come to the correct code for your equipment.
- If the video equipment does not have a certain function, the corresponding button on this Remote Commander will not operate.
- In some rare cases, you may not be able to operate your non-Sony video equipment with the supplied Remote Commander. This is because your equipment may use a code that is not provided with this Remote Commander. In this case, please use the equipment's own remote control unit.

CAUTION

When you remove the batteries from the Remote Commander, all the settings will revert to the Sony Beta setting. Reset the codes by following the steps on p. 55.



RM-Y118

Manufactures and Code Numbers (cable box)

MANUFACTURER	CODE
JERROLD	60, 61, 62, 63, 64, 65
PIONEER	69, 70
SCIENTIFIC ATLANTA	66, 67
TOCOM	71, 72
ZENITH	68

Operating a Cable Converter Box

Follow these instructions to set the manufacturer's code which will enable you to operate a connected cable converter box with the pre-programmed Remote Commander.

EXAMPLE: Operate a connected Zenith cable converter box.

1 Set the TV/CABLE selector to CABLE.

Notes

- If more than one code number is listed, try entering them one by one until you come to the correct code for your equipment.
- If you enter a new code number, the code number you previously entered at that setting is erased.
- In some rare cases, your equipment may use a code that is not provided with this Remote Commander and you may not be able to operate your cable converter box with the supplied Remote Commander. In this case, use the equipment's own remote control unit.

2 While pressing CODE SET, press 6 and 8 (Zenith's code number -see chart below) and ENTER.

A long beep sounds, indicating that the code has been set.

Note

If you press a wrong code or if the code has not been set, four short beeps sound. Repeat step 2 to set the code.

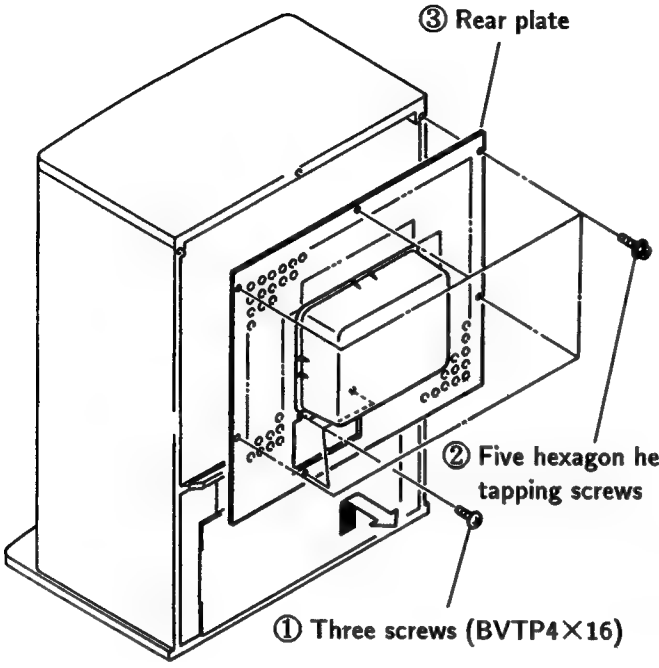
3 Use CABLE POWER and the TV control buttons (0 – 9, ENTER, JUMP and CH +/–) to operate the cable converter box.

To operate the TV
Set the TV/CABLE selector to TV, then use the TV control buttons to control the TV.

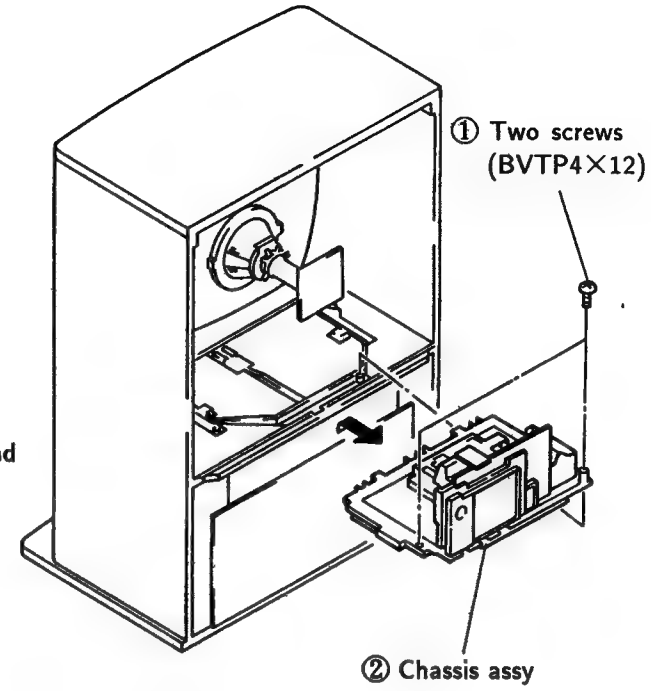
For more details on operating the cable box
Refer to the operating instructions that come with the cable box.

SECTION 2
DISASSEMBLY

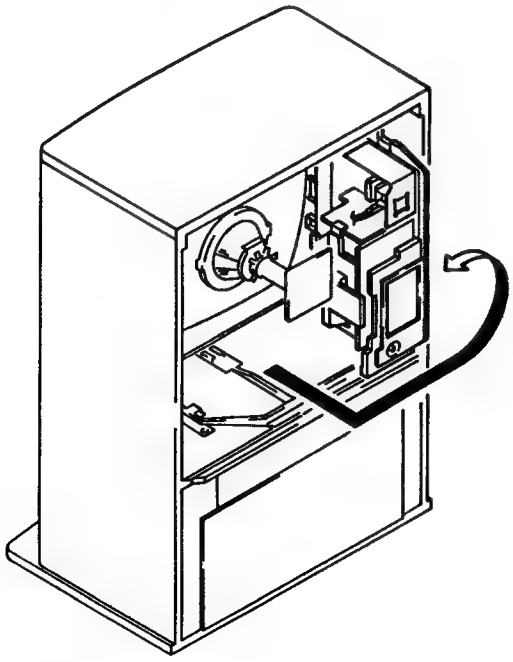
2-1. REAR PLATE REMOVAL



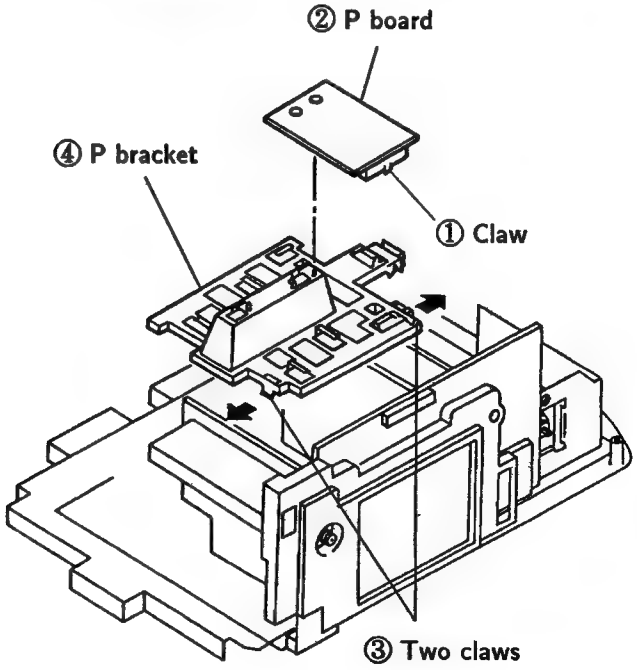
2-2. CHASSIS ASSY REMOVAL



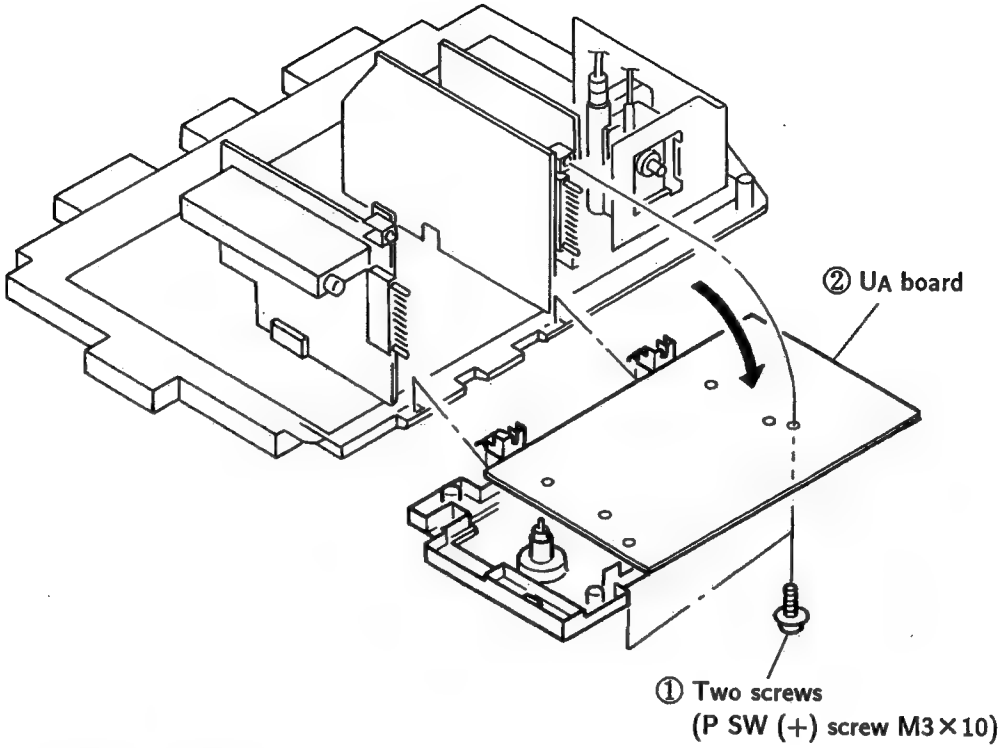
2-3. SERVICE POSITION



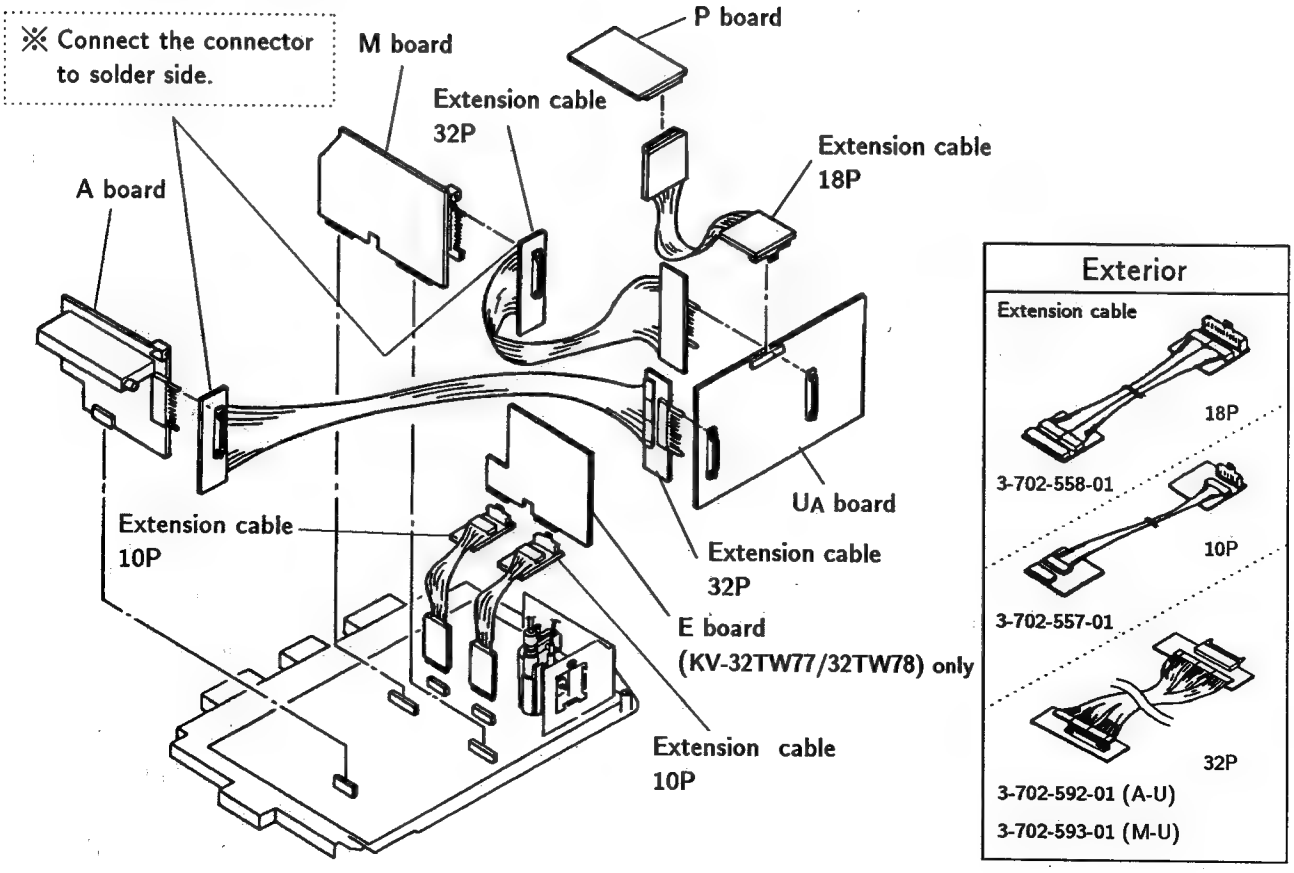
2-4. P BOARD AND P BRACKET REMOVAL



2-5. UA BOARD REMOVAL

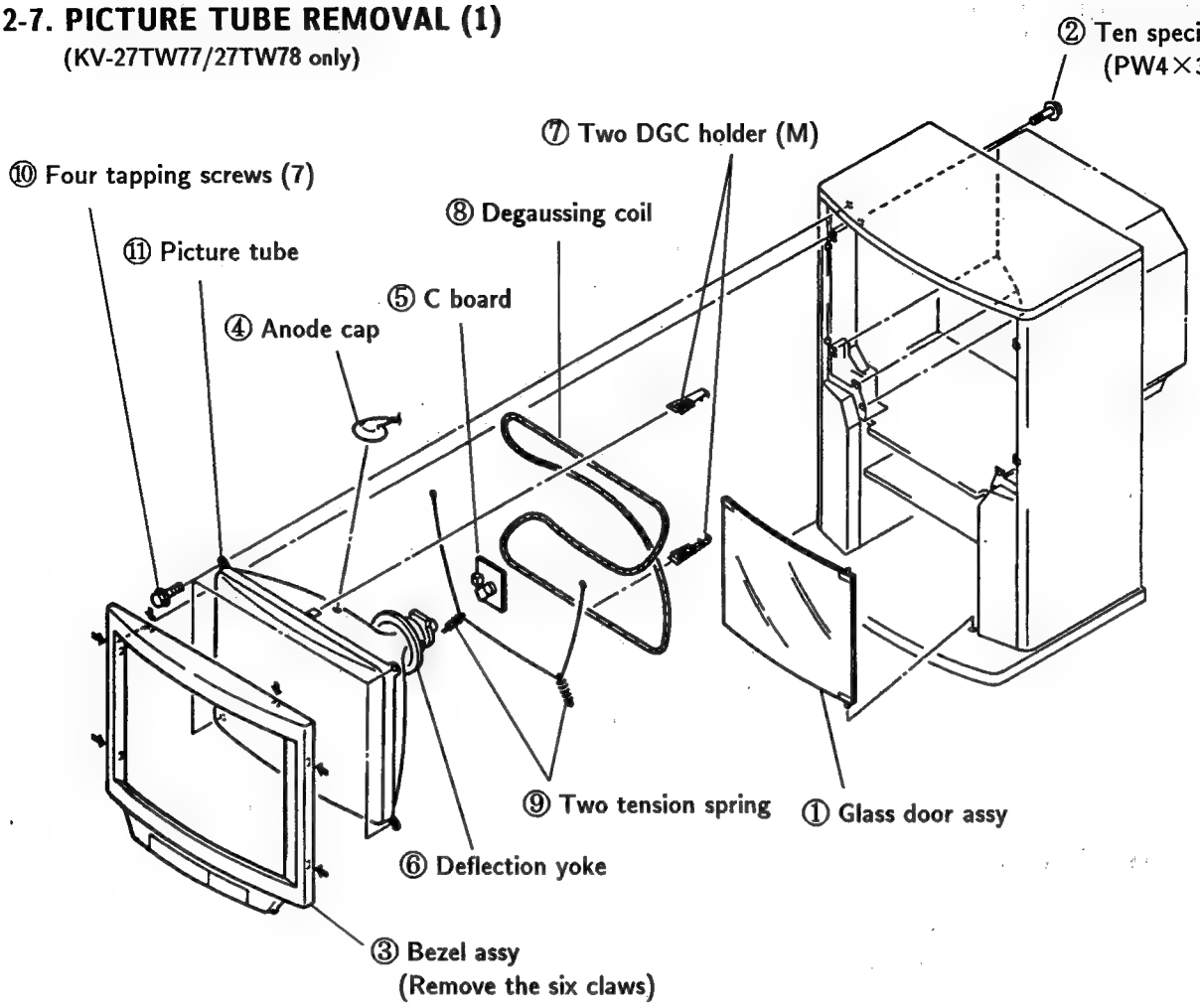


2-6. EXTENSION CABLE



2-7. PICTURE TUBE REMOVAL (1)

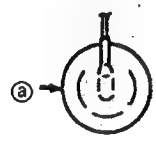
(KV-27TW77/27TW78 only)

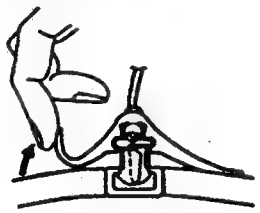


• REMOVAL OF ANODE-CAP

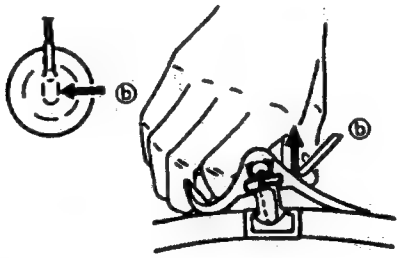
NOTE : Short circuit the anode of the picture tube and the anode cap to the metal chassis, CRT chield or carbon painted on the CRT, after removing the anode.

• REMOVING PROCEDURES

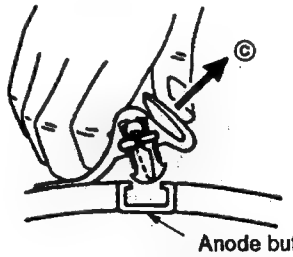




① Turn up one side of the rubber cap in the direction indicated by the arrow ⓐ.



② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow ⓑ.



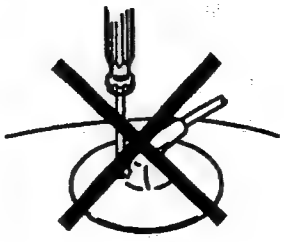
③ When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling up it in the direction of the arrow ⓒ.

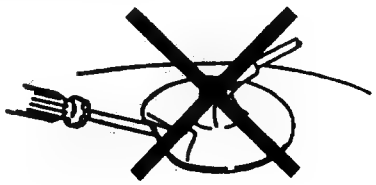
• HOW TO HANDLE AN ANODE-CAP

① Don't hurt the surface of anode-caps with sharp shaped material!

② Don't press the rubber hardly not to hurt inside of anode-caps!
A material fitting called as shatter-hook terminal is built in the rubber.

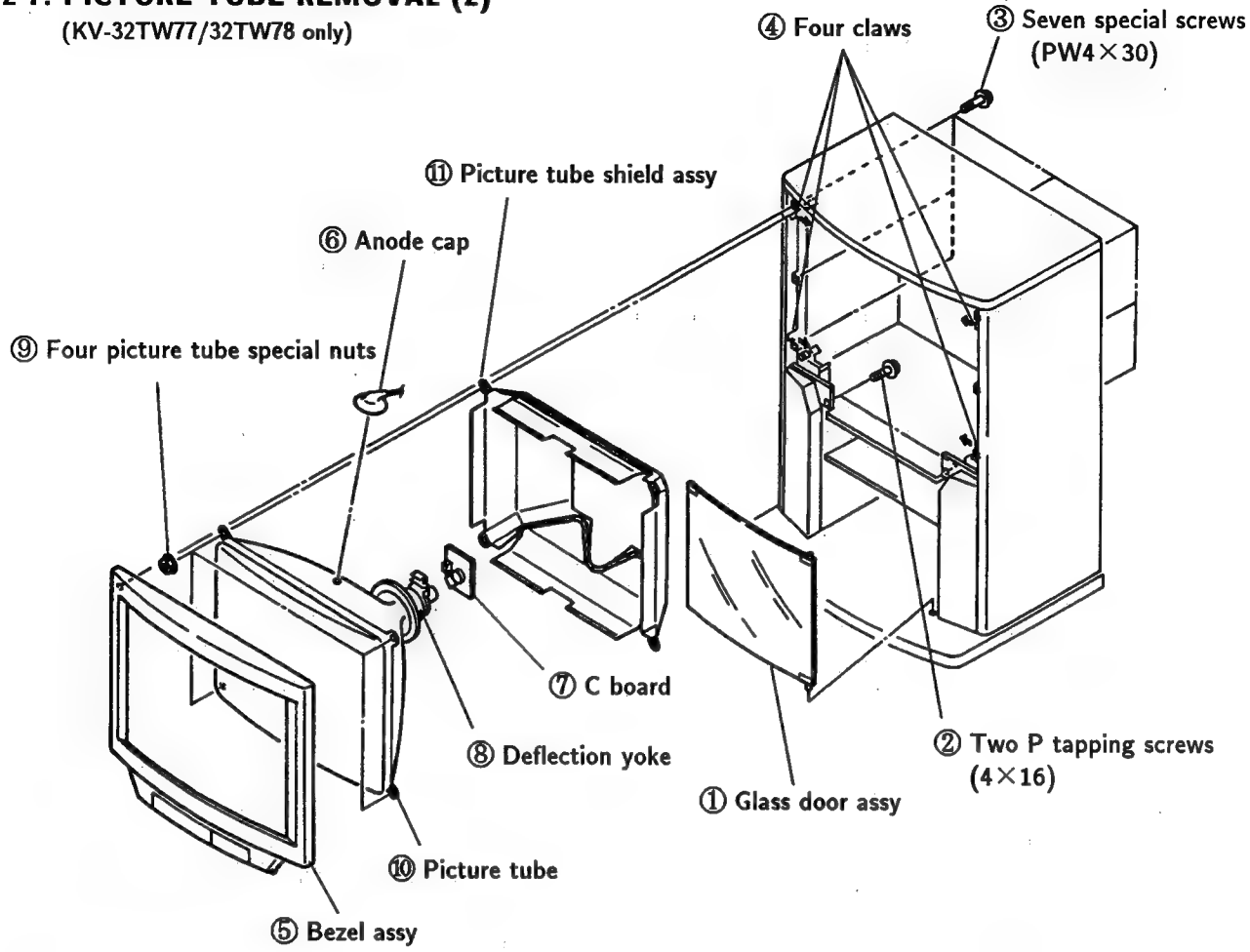
③ Don't turn the foot of rubber over hardly!
The shatter-hook terminal will stick out or hurt the rubber.





2-7. PICTURE TUBE REMOVAL (2)

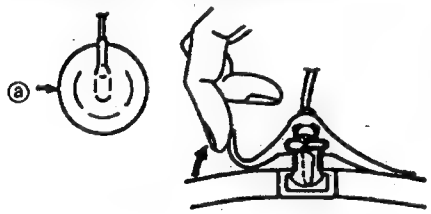
(KV-32TW77/32TW78 only)



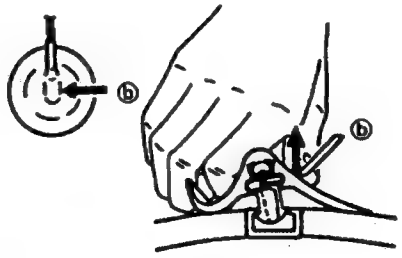
• REMOVAL OF ANODE-CAP

NOTE : Short circuit the anode of the picture tube and the anode cap to the metal chassis, CRT chield or carbon painted on the CRT, after removing the anode.

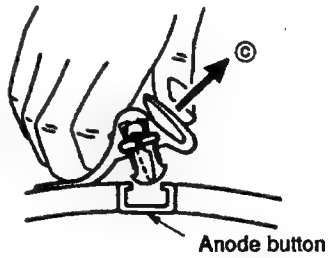
• REMOVING PROCEDURES



① Turn up one side of the rubber cap in the direction indicated by the arrow ⓐ.



② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow ⓑ.



③ When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling up it in the direction of the arrow ⓒ.

• HOW TO HANDLE AN ANODE-CAP

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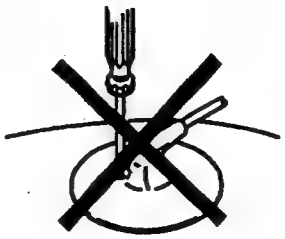
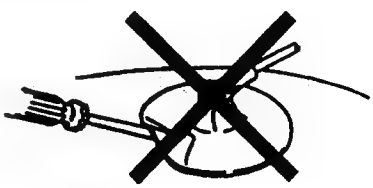




2-8. REPAIR OF CHIP COMPONENT CIRCUIT BOARD

2-8-1. POINTS OF COMPONENT REMOVAL

Handing of blower type soldering iron

If hot blast is too strong or applied from a slanting direction, small components and solder near the component being removed can be blown off. Do not use blower type without temperature control.

2-8-2. NOTES ON SOLDERING FOR CHIP COMPONENTS

1) During soldering a chip component, if a soldering iron is applied for a long time, the heat may damage the component or cause pattern peeling.
2) Do not reuse a removed component. The characteristics of such a component may deteriorate.
3) Use wire solder containing silver (ϕ 0.3 or ϕ 0.6). (The pin electrodes of the laminated chip capacitor are silver +palladium, so if wire solder which does not contain silver is used, the silver of the pin electrode will be sucked into the solder.)

2-8-3. REMOVAL AND MOUNTING OF COMPONENTS

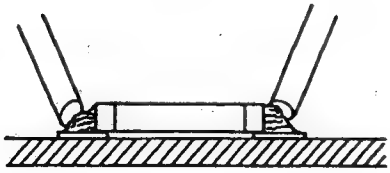
Chip resistor and chip capacitor

REMOVAL

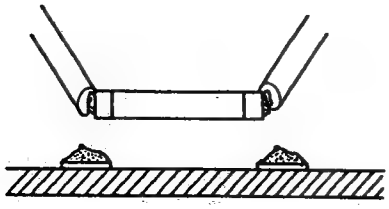
• Using two soldering irons

1) Mounted state

2)Melt the solder.

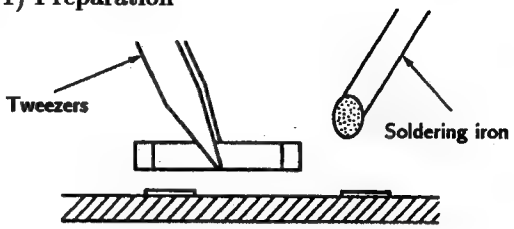


3)Remove the component.

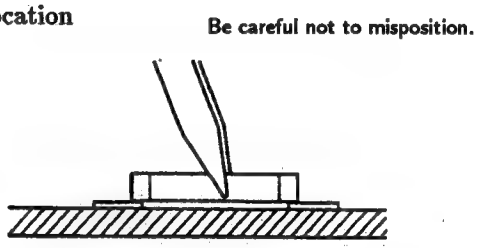


SOLDERING

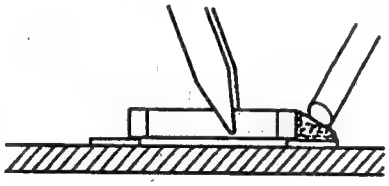
1) Preparation



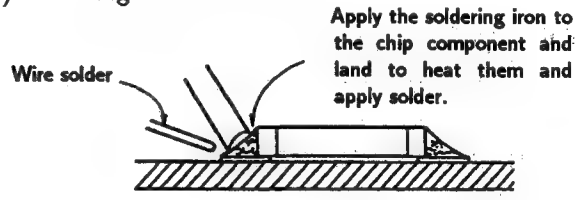
2) Location



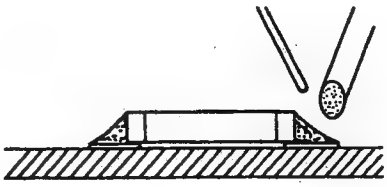
3) Tack soldering and flux application



4) Soldering



5) Soldering (Fix the fillet.)



6) Visual inspection

Check for the following defects :

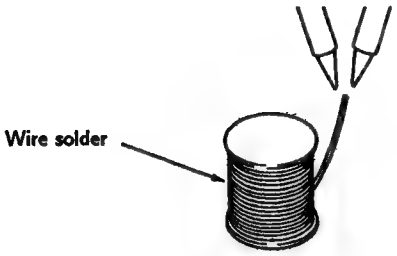
- No-soldered part
- Bridge (to other components or lands)
- Mispositioning
- Other defects

2-8-4. MINI-TRANSISTOR

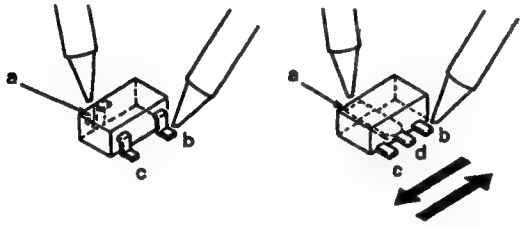
REMOVAL

- Using two soldering irons

1) Put a little solder on the tip of two soldering irons.



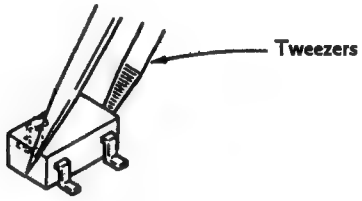
2) Apply the tip of one soldering iron to the point "a" and the other to the points "b" → "c" (or "b" → "d" → "c") and move the component in the directions indicated by arrows in the figure to remove it.



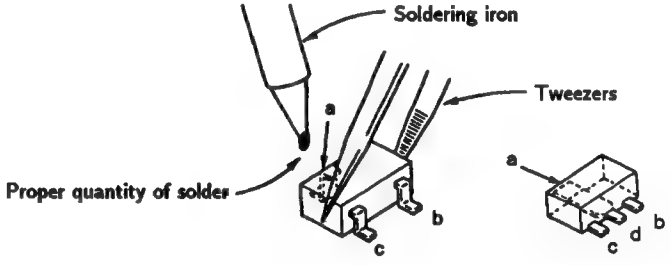
MOUNTING

1) Apply a little flux to the land with a brush.

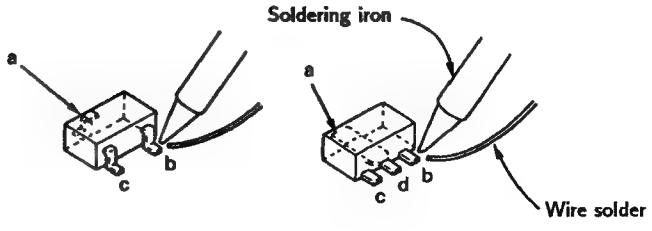
2) Place the component in position using tweezers.



3) Put a little solder on the tip of the soldering iron and solder the point "a" to fix the component.

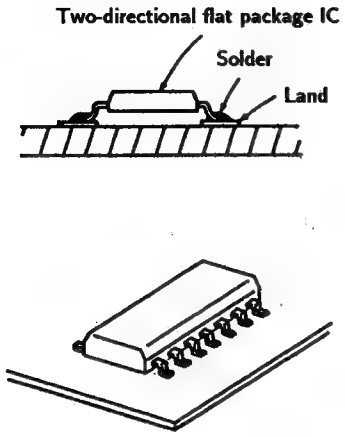


4) Bring the tip of the soldering iron and the wire solder close to the point to be soldered. Solder the points "b" → "c" (or "b" → "d" → "c") in order.



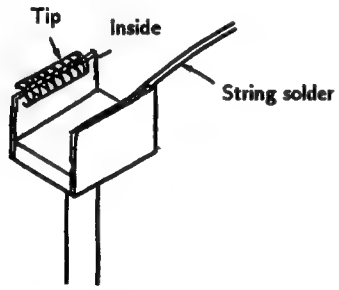
2-8-5. TWO-DIRECTIONAL FLAT PACKAGE IC

MOUNT CONDITION

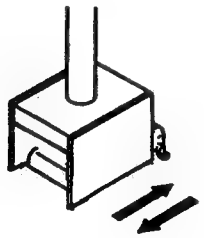


REMOVAL

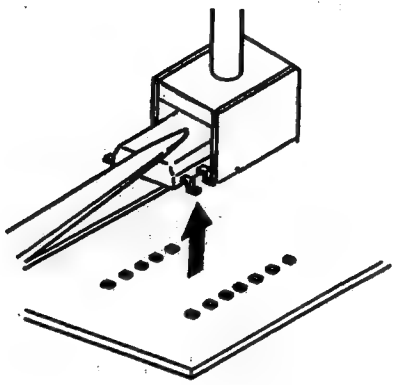
1) Apply some solder on the inside and the tip of the iron tip jig.



2) Place the iron tip jig over the IC, and move the jig to and fro as shown in the figure.

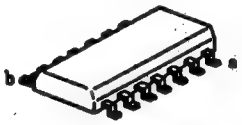


3) When the solder melts, lift the IC with a pair of tweezers and remove.

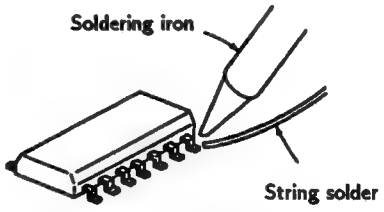


INSTALLATION

1) Place the two-directional flat package IC at the appointed position, solder pins a and b on the diagonal, and fasten it.

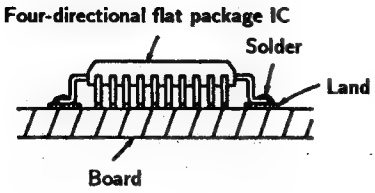


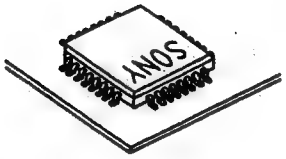
2) Solder the remaining pins with the soldering iron.



2-8-6. FOUR-DIRECTIONAL FLAT PACKAGE IC

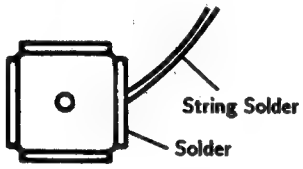
MOUNT CONDITION



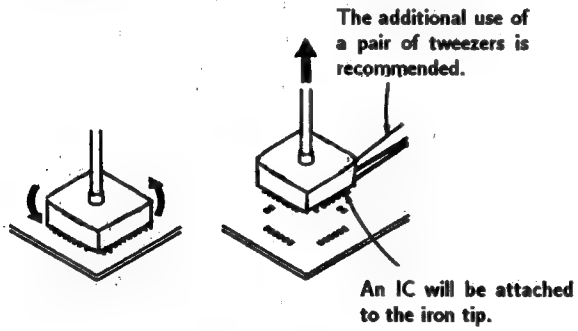


REMOVAL

1) Apply solder on the tip of the iron tip jig.



2) Place the iron tip jig over the IC, wait about two to three seconds, rotate the iron slightly and lift it up.



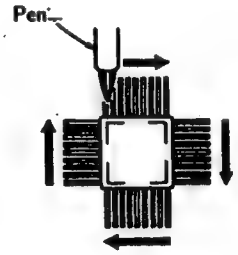
Note : For flat ICs of above 52P, the IC may not be completely attracted when the iron tip jig is lifted up. In these cases, use a pair of tweezers to remove.

INSTALLATION

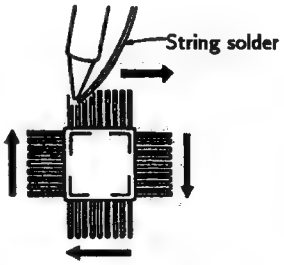
1) Place the four-directional flat package IC at the appointed position.

2) Apply a slight amount of solder on the iron tip, and solder the three sections in the order of a → b → c, and fix.

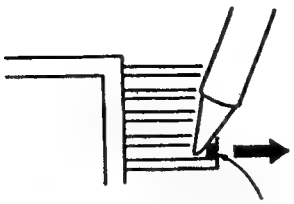
3) Apply a slight amount of flux with a pen on all four directions.



4) Apply solder on the iron tip and the string solder, and slide and solder in the directions of the arrows.



Note: 1) After soldering, if there are bridged sections, correct by sliding the soldering iron in the direction of the arrow.



Bridged section

If the bridges cannot be corrected using the above method, apply some flux with a pen and try again.

2) Soldering can be carried out more easily by sliding the iron tip near the tip of the IC leg. (Fig. A)

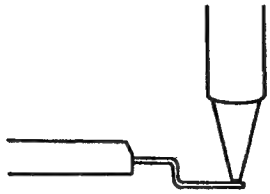


Fig. A

Be careful not to slide the bent sections of the leg as shown in Fig. B as soldering bridges will be formed.

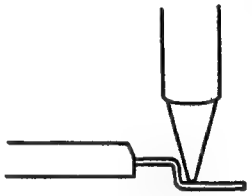
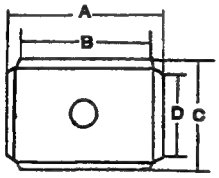
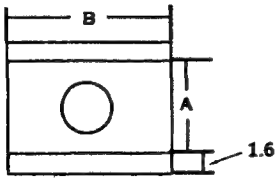
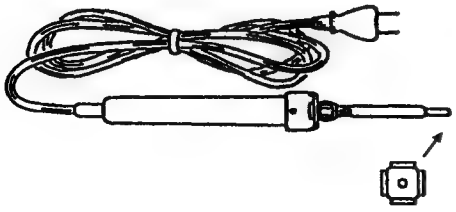


Fig. B

Exterior	Description	Part No.	Measure (mm)			
			A	B	C	D
	jig for removing 4-sided flat package IC	3-702-554-01	12.5	9.5	12.5	9.5
		〃 11	15.5	12.5	15.5	12.5
		〃 21	16.3	13.3	16.3	13.3
		〃 31	17.0	14.0	17.0	14.0
		〃 41	23.0	20.0	17.0	14.0
		〃 51	20.0	17.0	20.0	17.0
	jig for removing 2-sided flat package IC	3-702-555-01	6.0	5.0		
		〃 11	6.0	10.0		
		〃 21	7.0	12.5		
		〃 31	9.0	15.2		
		〃 41	9.0	18.0		
	soldering iron	3-702-552-01	55W 60g length 210mm			
	soldering holder	3-702-553-01				

SECTION 3
SET-UP ADJUSTMENTS

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.
- These adjustments should be performed with rated power supply voltage unless otherwise noted.

Controls and switch should be set as follows unless otherwise noted :

PICTURE control . . . . . RESET
BRIGHTNESS control . . . . . center

Preparations :

- In order to reduce the influence of geomagnetism on the set's picture tube face it east or west.
- Switch on the set's power and degauss with the degausser.

3-1. BEAM LANDING

1. Input the white signal with the pattern generator.
   Contrast
   Bightness } normal
2. Set the pattern generator raster signal to green.
3. Move the deflection yoke to the rear and adjust with the purity control so that the green is at the center and the blue and the red take up equally sized areas on each side.
   (See Figures 3-1 through 3-3.)
4. Move the deflection yoke forward and adjust so that entire screen is green. (See Figure 3-1.)
5. Switch the raster signal to blue, then to red and verify the condition.
6. When the position of the deflection yoke has been decided, fasten the deflection yoke with the screws.
7. If the beam does not land correctly in all the corners, use a magnet to adjust it.
   (See Figure 3-4.)

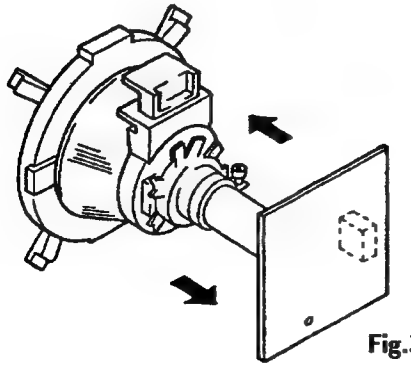


Fig.3-1

Perform the adjustments in order as follows :

1. Beam Landing
2. Convergence
3. Focus
4. White Balance

Note : Test Equipment Required.

1. Color-bar/Pattern Generator
2. Degausser
3. Oscilloscope

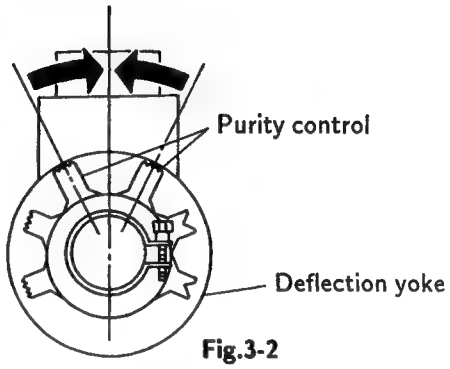


Fig.3-2

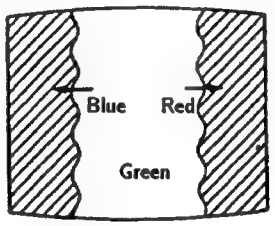


Fig.3-3

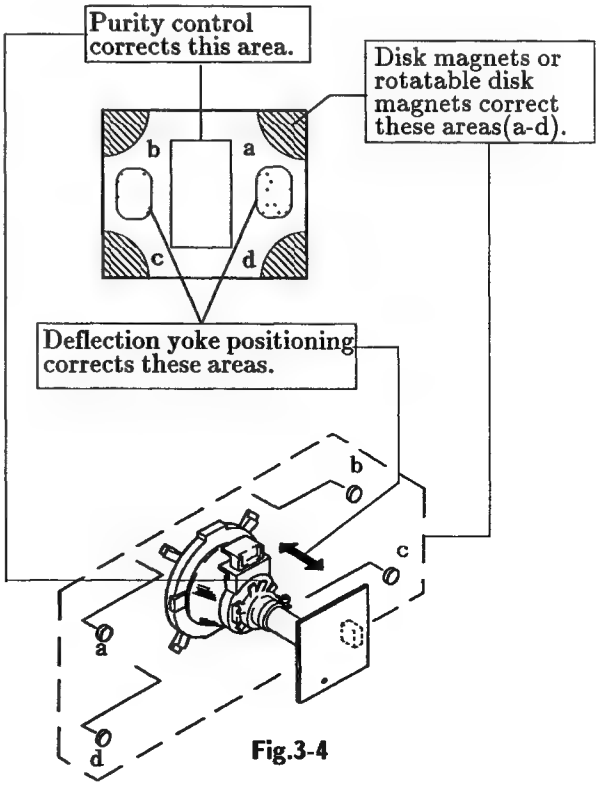


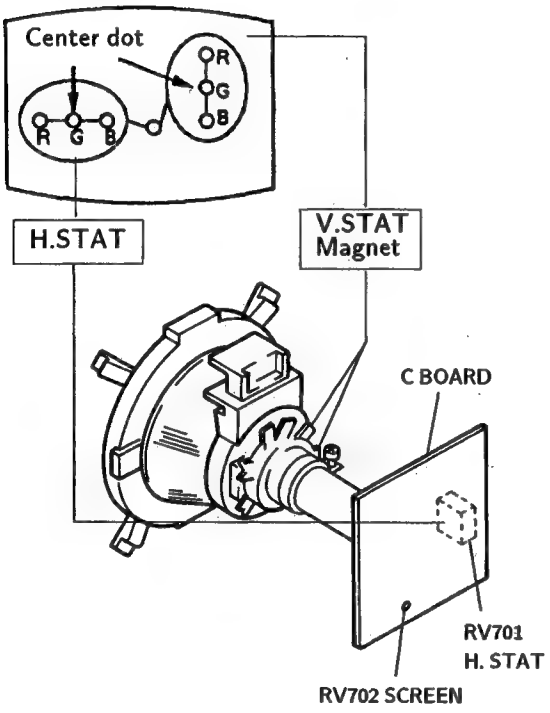
Fig.3-4

3-2. CONVERGENCE

Preparation :

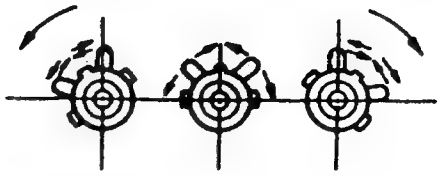
- Before starting this adjustment, adjust the focus, horizontal size, and vertical size.
- Minimize the brightness setting.
- Provide dot pattern.

(1) **Horizontal and Vertical Static Convergence**

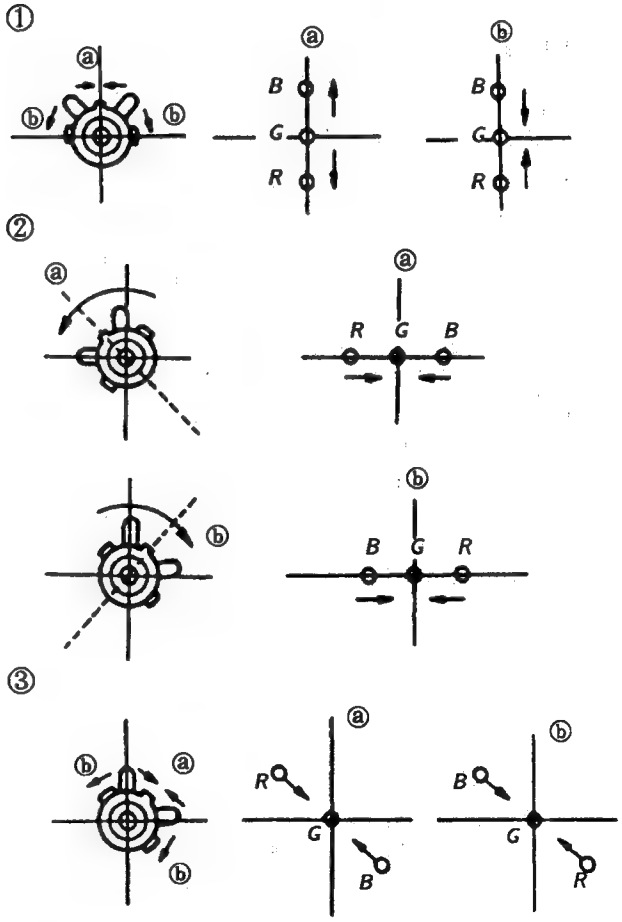


1. (Moving horizontally), adjust the H.STAT control so that the red, green, and blue points are on top of each other at the center of the screen.
2. (Moving vertically), adjust the V.STAT magnet so that the red, green, and blue points are on top of each other at the center of the screen.
3. If the H.STAT variable resistor cannot bring the red, green, and blue points together at the center of the screen, adjust the horizontal convergence with the H.STAT variable resistor and the V. STAT magnet in the manner given below.
   (In this case, the H.STAT variable resistor and the V.STAT magnet influence each other)

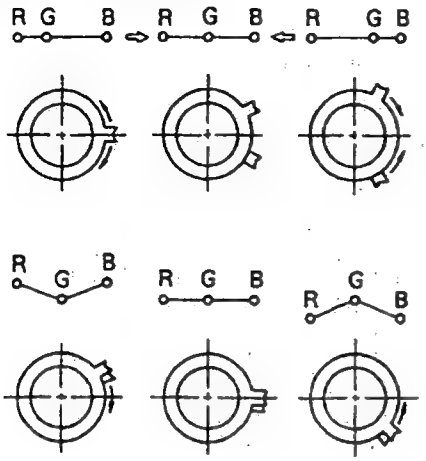
- Tilt the V.STAT magnet and adjust the static convergence by opening or closing the V.STAT magnet.



4. If the V.STAT magnet is moved in the direction of the ⓐ and ⓑ arrows, the red, green, and blue points move as shown below.



- Operation of BMC (Hexapole) Magnet



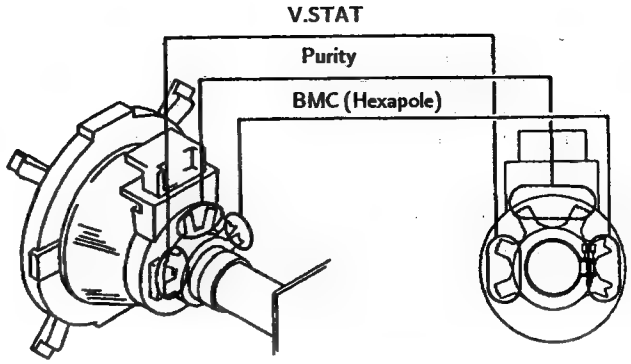
- The respective dot positions resulting from moving each magnet interact, so be sure to perform adjustment while tracking.
  Use the H.STAT VR to adjust the red, green, and blue dots so they coincide at the center of screen (by moving the dots in the horizontal direction).

(2) **Dynamic Convergence Adjustment**

Preparations :

- Before starting this adjustment, adjust the horizontal static convergence and the vertical static convergence.

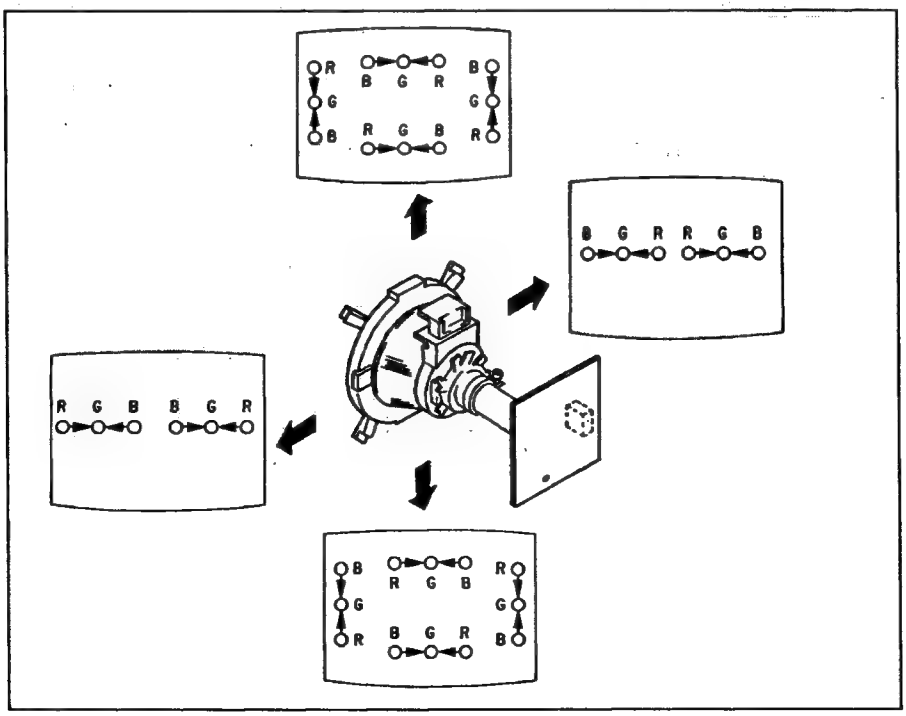
1. Slightly loosen the deflection yoke screws.
2. Remove the deflection yoke spacer.



• Y separation axis correction magnet adjustment

1. Receive the cross-hatch signal, and adjust [PIX] to "MIN" and [BRT] to "standard".
2. Adjust the deflection yoke to the upright condition when it hits the CRT.
3. Adjust so that the Y separation axis correction magnet on the neck assembly is symmetrical at the top and bottom (open state).
4. Return the deflection yoke to its original position.

3. Move the deflection yoke as shown in the figure below and optimize the convergence.
4. Tighten the deflection yoke screws.
5. Install the defelection yoke spacer.

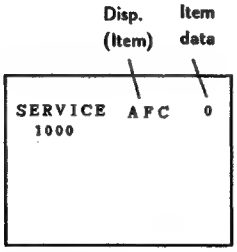


(3) **Dynamic Convergence Circuit Adjustment (32 inch only)**

SERVICE MODE PROCEDURE

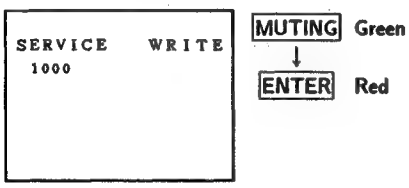
1. Standby mode.(Power off)
2. DISPLAY → 5 → VOL (+) → POWER on the Remote Commander. (Press each button within a second.)

SERVICE ADJUSTMENT MODE IN

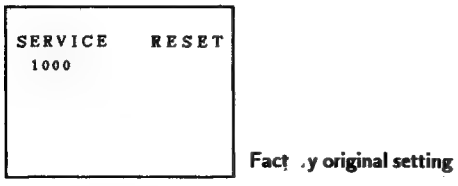


3. The CRT displays the item Being adjusted.
4. Press 1 or 4 on the Remote Commander to select the item.
5. Press 3 or 6 on the Remote Commander to change the data.
6. Press MUTING then ENTER to write into memory.

SERVICE ADJUSTMENT MODE MEMORY



7. Press 8 then ENTER on the Remote Commander to initlalize.



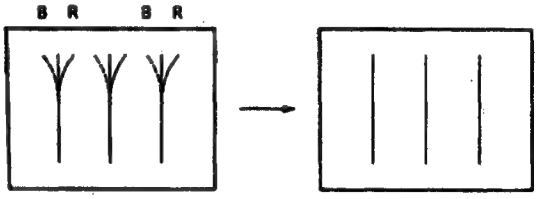
8. Turn set off and on to exit.

- Set to Service Mode.
- Input a cross-hatch signal.
- Press 1 and 4 serect an item of adjustments.
- Adjust 3 and 6 to the best picture.

No.	Disp.	Item	Ave.Data
39	UYBO	Upper Y-Bow	31
40	LYBO	Lower Y-Bow	25
41	HAMP	H. Amp	33
42	HTIL	H. Tilt	33
43	UCBO	Upper C-Bow	38
44	UTIL	Upper Tilt	40
45	LCBO	Lower C-Bow	41
46	LTIL	Lower Tilt	46
47	DCSH	DC Shift	37

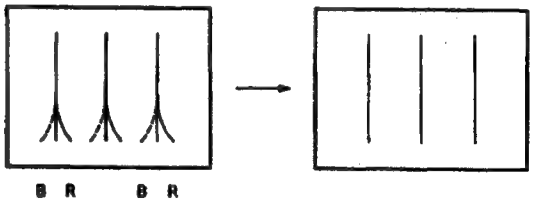
U. YBOW

Select UYBO with 1 and 4



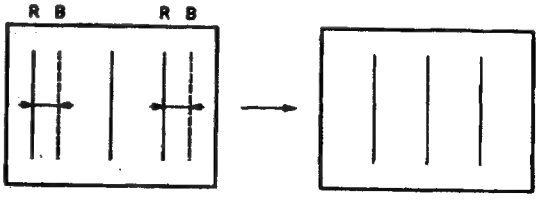
L. YBOW

Select LYBO with 1 and 4



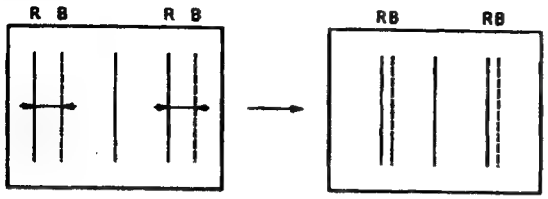
H. AMP

Select HAMP with 1 and 4



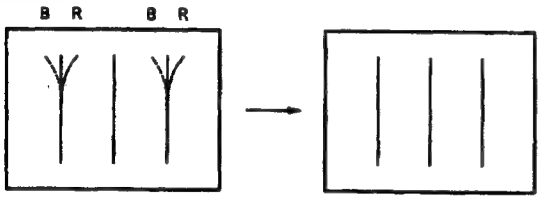
H. TILT

Select HTILT with [1] and [4]



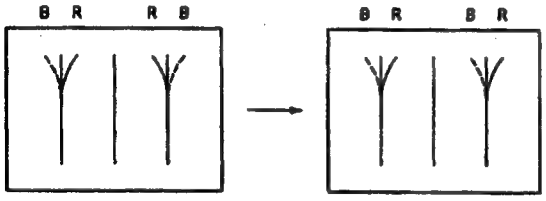
U. CBOW

Select UCBO with [1] and [4]



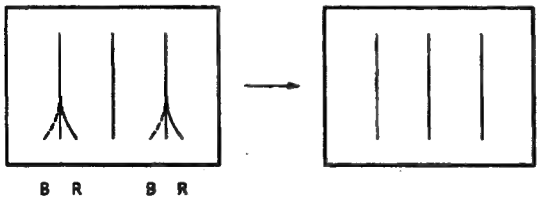
U. TILT

Select UTIL with [1] and [4]



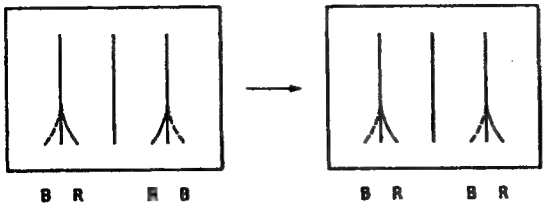
L. CBOW

Select LCBO with [1] and [4]

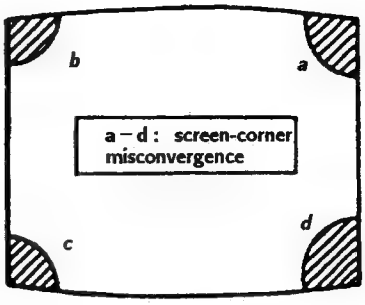


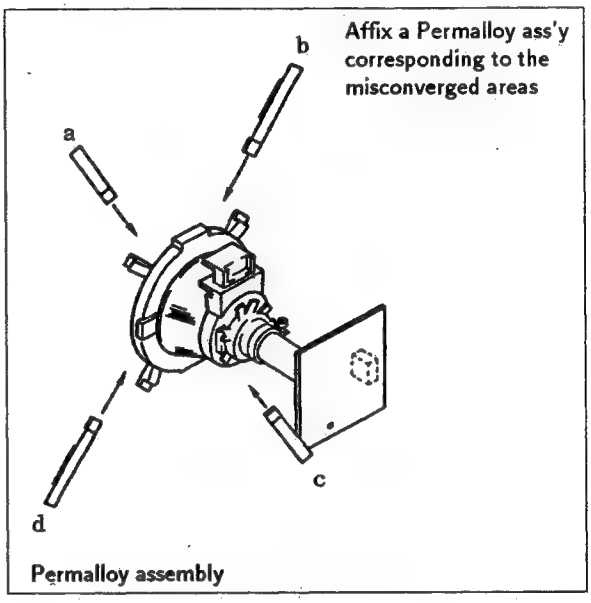
L. TILT

Select L. TIL with [1] and [4]



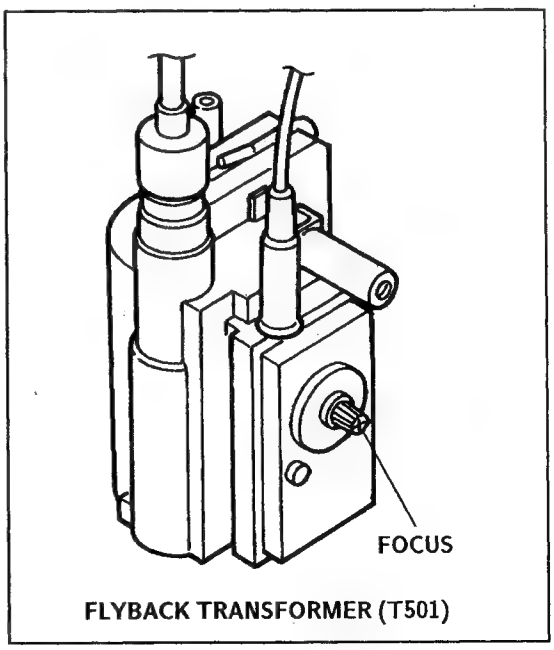
(4) Screen-corner Convergence





3-3. FOCUS ADJUSTMENT

Adjust FOCUS control on the flyback transformer for a best focus.



3-4. G2 (SCREEN) AND WHITE BALANCE ADJUSTMENTS

1. G 2 (SCREEN) ADJUSTMENT(RV 702)

1. Set the PICTURE and BRIGHTNESS to normal.
2. Confirm G 1 voltage is within 30.0±5 V.
3. Apply DC voltage of 180 V to the cathodes of R,G and B from DC stabilized power source.
4. While watching the picture, adjust the G2 control (RV 702) to the just the retrace line disappears.

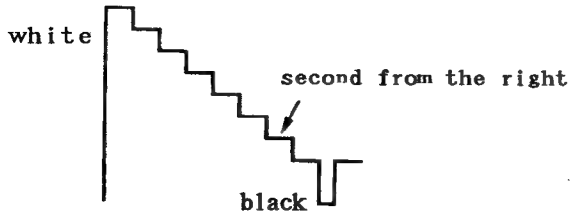
2. WHITE BALANCE ADJUSTMENTS

No.	Disp.	Item	Ave. Data
14	GAMP	Green Amp	20
15	BAMP	Blue Amp	17
16	GCUT	Green Cut-off	7
17	BCUT	Blue Cut-off	8
22	SBRT	Sub Bright	35

1. Input an entire white signal.
2. Set to service adjustment mode.
3. Set the PICTURE and BRIGHT to minimum.
4. Adjust with SBRT if necessary.
5. Select G CUT and B CUT with [1] and [4].
6. Adjust with [3] and [6] for the best white balance.
7. Set the PICTURE and BRIGHT to maximum.
8. Select GAMP and BAMP with [1] and [4].
9. Adjust with [3] and [6] for the best white balance.
10. Write into the memory by pressing [MUTING] then [ENTER].

3. SUB BRIGHT ADJUSTMENT

1. Set to service mode.
2. Input a staircase signal of black and white from the pattern generator.
3. BRIGHTNESS ··· RESET
   PICTURE ····· minimum
4. Select SBRT with [1] and [4], and adjust SUB BRIGHT level with [3] and [6] so that the stripe second from the right is dimly lit.



SECTION 4
SAFETY RELATED ADJUSTMENTS

⊠ R511 CONFIRMATION METHOD (HOLD-DOWN CONFIRMATION) AND READJUSTMENTS

The following adjustments should always be performed when replacing the following components (marked with ◪ on the schematic diagram).
PM501, R511, R632, R645, R650

①

1. Preparation before confirmation
   1) Remove R635 on the D board and connect a variable resistor (RV1: about 4.7kΩ-10kΩ) between pin ① of IC601 and B+ line.
   2) Supply 130±2.0V AC to with variable auto-transformer.
2. Hold-down operation confirmation
   1) Turn the POWER switch ON, and receive entirely white signals and adjust ABL current to 1760±50μA with PICTURE and BRIGHT etc controls.
   2) Increase B+ line voltage gradually by adjusting the resistor of RV1. Confirm that the minimum voltage is less than 142.5V DC (27 inch) 140.0V DC (32 inch) whereby the raster disappears during operation of hold-down circuit.
      NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.
   3) Turn the POWER switch ON, and receive dot signals and adjust ABL current to 160±50μA with PICTURE and BRIGHT etc controls.
   4) Increase B+ line voltage gradually by adjusting the resistor of RV1. Confirm that the minimum voltage is less than 143.5V DC whereby the raster disappears during operation of hold-down circuit.
      NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.
3. Hold-down readjustment
   When step 2 is not satisfied, readjustment should be performed by altering the resistance value of R511 (a component marked with ⊠).

⊠ R524 CONFIRMATION METHOD (HOLD-DOWN CONFIRMATION) AND READJUSTMENTS

The following adjustments should always be performed when replacing the following components (marked with ◪ on the schematic diagram).
IC601, PM501, D504, R509, R524, R634, R635, T501

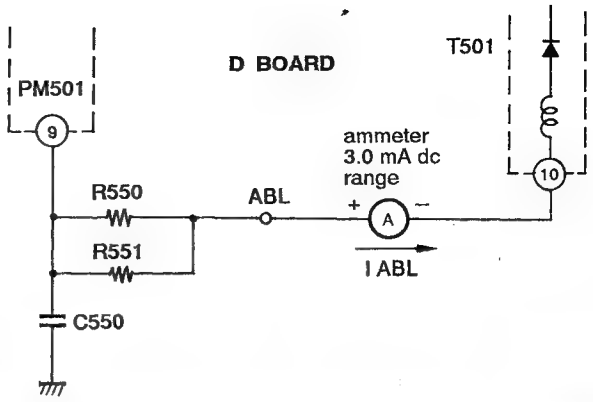
②

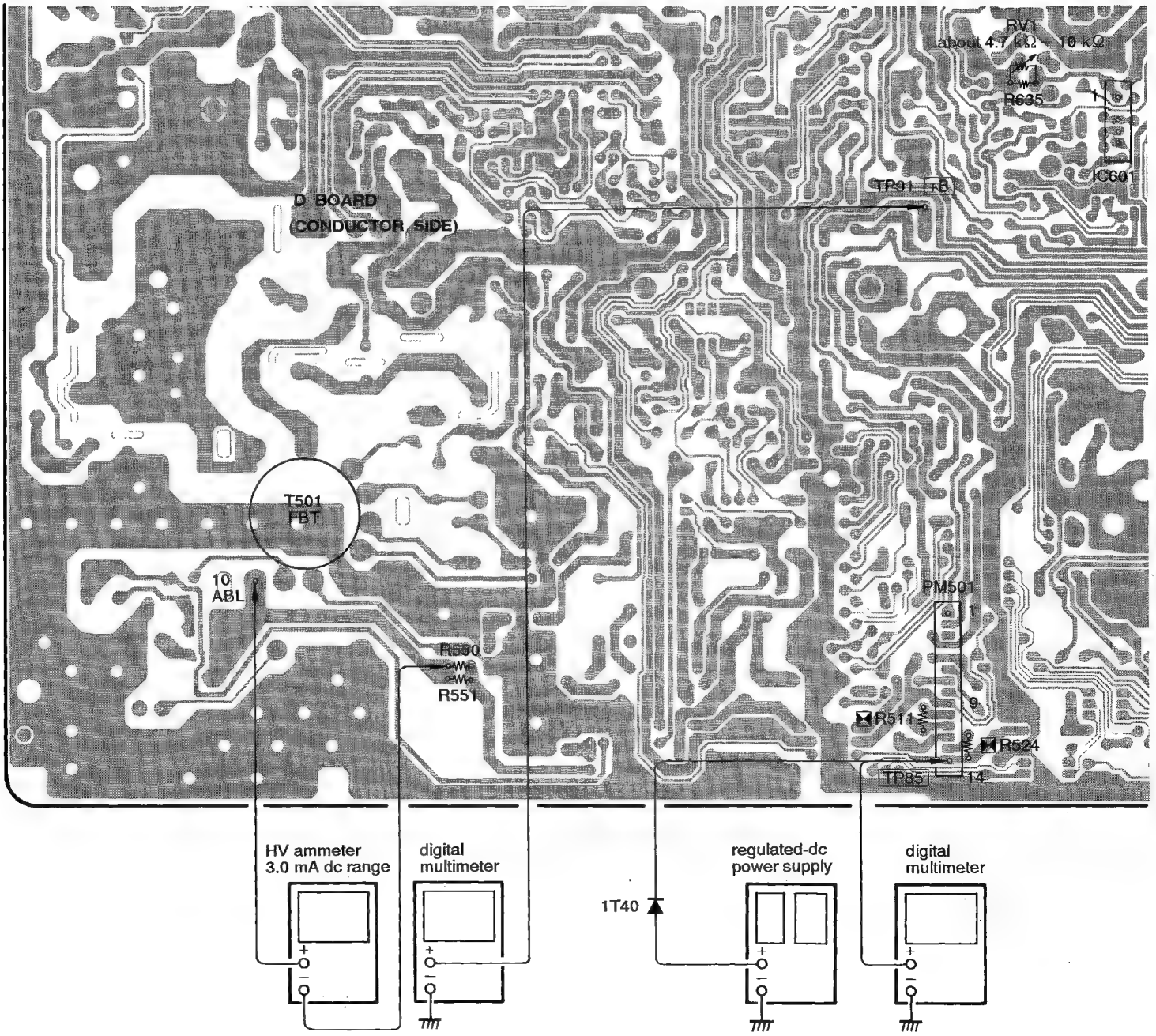
1. Preparation before confirmation
   1) Turn the POWER switch ON, and receive entirely white signals and set the PICTURE and BRIGHT controls to maximum.
   2) Confirm that voltage of the check terminal of TP-81 (D BOARD) is more than 114.0V DC (27 inch) 122.3V DC (32inch) when the set is operating normally with 120.0±2.0V AC supply.
2. Hold-down operation confirmation
   1) Turn the POWER switch ON, and receive entirely white signals and adjust ABL current to 1760±50μA with PICTURE and BRIGHT etc controls .
   2) Apply DC voltage of over 130.0V DC gradually to the check terminal of TP-85 (D BOARD) via 1T40 from the DC stabilized power source. Confirm that the minimum voltage is less than 137.5V DC (27inch) 143.5V DC (32inch) whereby the raster disappears during operation of hold-down circuit.
      NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.
   3) Turn the POWER switch ON, and receive dot signals and adjust ABL current to 160±50μA with PICTURE and BRIGHT etc controls .
   4) Apply DC voltage of over 130.0V gradually to the check terminal of TP-85 (D BOARD) via 1 T40 from the DC stabilized power source. Confirm that the minimum voltage is less than 138.0V DC (27inch) 144.1V DC (32inch) whereby the raster disappears during operation of hold-down circuit.
      NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.
3. Hold-down readjustment
   When step 2 is not satisfied, readjustment should be performed by altering the resistance value of R524 (a component marked with ⊠).

B+ VOLTAGE CONFIRMATION

The following adjustments should always be performed when replacing IC601 and R635.

1) Supply 130±2.0V AC to with variable autotransformer.
2) Receive entirely monoscope signal.
3) Set the PICTURE control and the BRIGHT controls in to initial reset.
4) Confirm the voltage of TP91 is less than 137.0V DC.
5) If step 4) is not satisfied, replace IC601 and R635 repeat above steps.





SECTION 5
CIRCUIT ADJUSTMENTS

5-1. ELECTRICAL ADJUSTMENT BY REMOTE COMMANDER

Use of Remote Commander can be performed circuit adjustments about this model.

NOTE : Test Equipment Required.

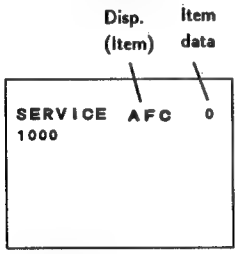
1. Pattern Generator
2. Frequency counter
3. Digital multimeter
4. Audio OSC

1. METHOD OF SETTING THE SERVICE ADJUSTMENT MODE

SERVICE MODE PROCEDURE

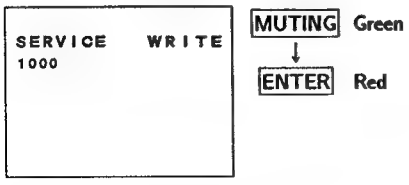
1. Standby mode.(Power off)
2. DISPLAY → 5 → VOL (+) → POWER on the Remote Commander. (Press each button within a second.)

SERVICE ADJUSTMENT MODE IN

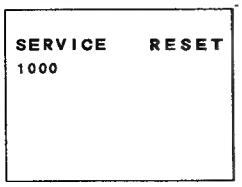


3. The CRT displays the item Being adjusted.
4. Press 1 or 4 on the Remote Commander to select the item.
5. Press 3 or 6 on the Remote Commander to change the data.
6. Press MUTING then ENTER to write into memory.

SERVICE ADJUSTMENT MODE MEMORY



7. Press 8 then ENTER on the Remote Commander to initialize.



Carry out step 7) when adjusting IDs 0 to 4 and when replacing and adjusting IC102.

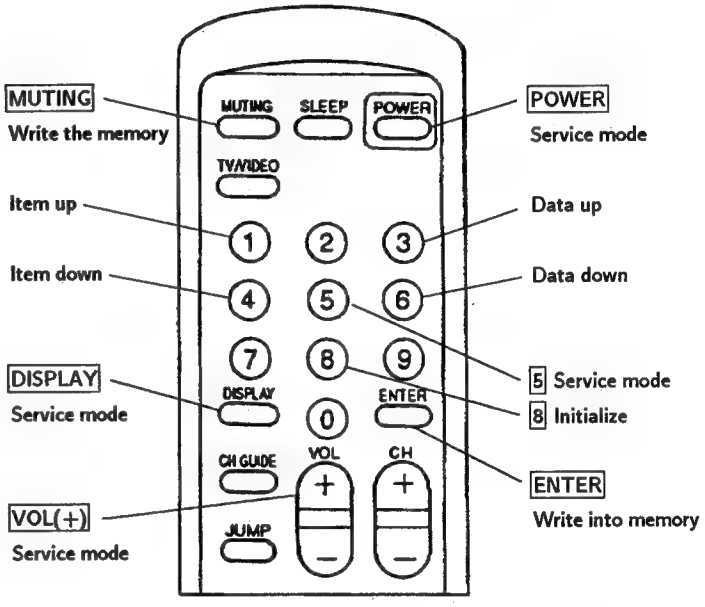
Factory original setting

8. Turn set off and on to exit.

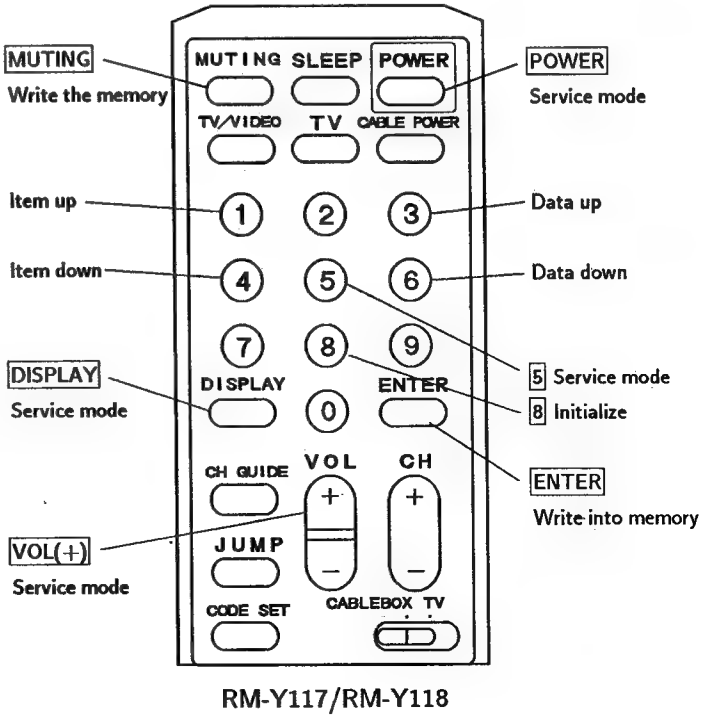
2. MEMORY WRITE CONFIRMATION METHOD

1. After adjustment, pull out the plug from AC outlet, and next place, plug in AC outlet again.
2. Turn the power switch ON and set to Service Mode.
3. Call the adjusted items again, confirm they were adjusted.

3. ADJUST BUTTONS AND INDICATOR



RM-Y116



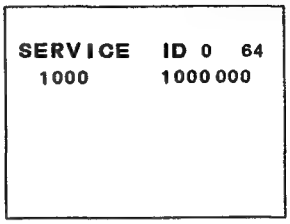
RM-Y117/RM-Y118

4. AN ITEM OF ADJUSTMENTS

No	Disp.	Item	Data range	Ave. data (27 inch)	Ave. data (32 inch)
1	AFC	AFC Loop Gain	0~3	* 0	* 0
2	HFRE	H. Frequency	0~127	70	70
3	VFRE	V. Frequency	0~31	16	16
4	VPOS	V. Center	0~31	17	17
5	VSIZ	V. Size	0~63	28	12
6	VLIN	V. Linearity	0~15	8	7
7	VSCO	V. Correction	0~15	6	6
8	HPOS	H. Center	0~15	6	5
9	HSIZ	H. Size	0~31	31	27
10	PAMP	Pin Amp	0~31	24	31
11	CPIN	Corner Pin	0~7	3	0
12	PPHA	Pin Phase	0~15	6	4
13	VCOM	V. Compensation	0~7	* 2	* 2
14	GAMP	Green Amp	0~31	20	20
15	BAMP	Blue Amp	0~31	17	17
16	GCUT	Green Cut Off	0~15	7	7
17	BCUT	Blue Cut Off	0~15	8	8
18	CROM	Chroma Trap	0~63	* 28	* 28
19	SPIX	Sub Contrast	0~63	20	20
20	SHUE	Sub Hue	0~63	33	33
21	SCOL	Sub Color	0~63	32	32
22	SBRT	Sub Bright	0~63	35	35
23	RGBP	RGB Picture	0~63	* 10	* 10
24	SHAP	Sharpness	0~15	* 7	* 7
25	VSMO	V Pull in Range	0, 1	* 0	* 0
26	REF	Refference line	0~3	* 2	* 2
27	ROFF	Red Out	0, 1	1	1
28	GOFF	Green Out	0, 1	1	1
29	BOFF	Blue Out	0, 1	1	1
30	ABLM	ABL Mode	0, 1	* 0	* 0
31	NOTC	Notch On/Off	0, 1	* 1	* 1
32	DRGB	OSD intensity	0, 1	* 0	* 0
33	VANG	V. Angle	0~63	0	0
34	DISP	Display Position	0~63	40	40
35	SVOL	Sub Volume	0~15	* 0	* 0
36	SBAL	Sub Balance	0~15	7	7
37	BASS	Sub Bass	0~15	* 8	* 8
38	TRE	Sub Treble	0~15	* 7	* 7
39	UYBO	Upper Y. Bow	0~63	—	31
40	LYBO	Lower Y. Bow	0~63	—	25
41	HAMP	H. Amp	0~63	—	33
42	HTIL	H. Tilt	0~63	—	33
43	UCBO	Upper C. Bow	0~63	—	38
44	UTIL	Upper Tilt	0~63	—	40
45	LCBO	Lower C. Bow	0~63	—	41
46	LTIL	Lower Tilt	0~63	—	46
47	DCSH	DC. Shift	0~63	—	37
48	PHPO	PinP H Position	0~127	76	76
49	PHUE	PinP Hue	0~31	* 0	* 0
50	ID-0	Model ID	0~127	by Model	by Model
51	ID-1	Model ID	0~127	by Model	by Model
52	ID-2	Model ID	0~127	by Model	by Model
	ID-2	Model ID	0~127	by Model	by Model
	ID-2	Model ID	0~127	by Model	by Model
53	ID-3	Model ID	0~127	by Model	by Model
54	ID-4	Model ID	0~127	by Model	by Model

* : Set-up value

Note : No.from 1 to 54 is to show adjusment order.



Please adjust the function values as shown below when IC 102 on M board was replaced.

KV-27TW77/27TW78
KV-32TW77/32TW78

No.	Disp.	Disp.	Data
50	ID-0	1 1 1 1 0 0 0	120
51	ID-1	1 1 1 1 1 1 1	127
52	ID-2	1 0 0 1 0 0 0	72
53	ID-3	1 0 0 0 0 0 0	64
54	ID-4	0 0 1 0 0 0 0	16

5-2. M BOARD ADJUSTMENTS

H.FREQUENCY ADJUSTMENT (HFRE)

1. Input a color-bar signal.
2. Set to Service adjustment Mode.
3. Connect a frequency counter to CN131 Pin⑬ (H. DRIVE) connector and ground.
4. Call the item of AFC, set to 3 level (free run).
5. Select HFRE with 1 and 4.
6. Adjust with 3 and 6 for the 15734± 60Hz.
7. Call the item of AFC again, adjust the level" 0 ".
8. Write into the memory by pressing MUTING then ENTER.

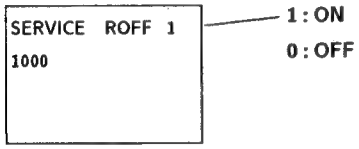
V.FREQUENCY ADJUSTMENT (VFRE)

1. Select video 1 with no connecting the signal.
2. Set to Service adjustment Mode.
3. Connect the frequency counter across connectorCN131 Pin⑦ (V. DRIVE) connector and ground.
4. Select VFRE with 1 and 4.
5. Adjust with 3 and 6 for the 55 ±0.5Hz.
6. Write the memory by pressing MUTING then ENTER .

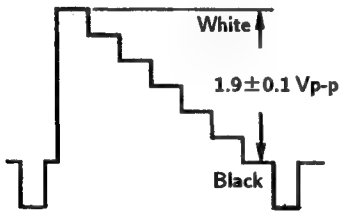
SUB CONTRAST ADJUSTMENT (SPIX)

1. Input a color-bar signal.
2. Set to Service adjustment Mode.
3. Set the conditions as follows.

PICTURE	·····	MAX
COLOR	·····	MIN
BRIGHT	·····	CENTER
R OFF	·····	ON (1)
G OFF	·····	OFF (0)
B OFF	·····	OFF (0)



4. Connect an oscilloscope to CN703 Pin① (R OUT) of C board and ground.
5. Select SPIX with 1 and 4.
6. Adjust with 3 and 6 for the 1.9±0.1Vp-p.

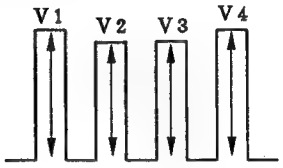


7. Write the memory by pressing MUTING then ENTER .
8. Return the following back to normal after adjustment.

PICTURE	·····	MAX
BRIGHT	·····	CENTER
COLOR	·····	CENTER
R OFF	·····	ON
G OFF	·····	ON
B OFF	·····	ON

SUB HUE, SUB COLOR ADJUSTMENT (SHUE, SCOL)

1. Input a color-bar signal.
2. Set to service adjustment mode.
3. Connect an oscilloscope to CN703 Pin③ (B OUT) of C board.
4. Select SHUE and SCOL with 1 and 4.
5. Adjust with 3 and 6 for the V1=V4 (SCOR) and V2 =V3 (SHUE).



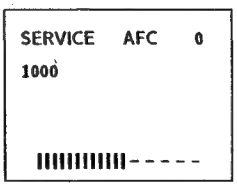
6. Increase the data of [SCOL] by 5 steps.
7. Write into the memory by pressing MUTING then ENTER .

SUB BARANCE ADJUSTMENT (SBAL)

1. Input a stereo signal.
2. Set to service adjustment mode.
3. Select SBAL with 1 and 4.
4. Adjust with 3 and 6 for the best sound balance
5. Write into the memory by pressing MUTING then ENTER .

DISPLAY POSITION ADJUSTMENT (DISP)

1. Input a color-bar signal.
2. Set to service adjustment Mode.
3. Select DISP with 1 and 4.
4. Adjust with 3 and 6 for the bar center.
5. Write the memory by pressing MUTING then ENTER .



H.CENTER ADJUSTMENT (H POS)

Note: Perform this adjustment after H.FREQUENCY ADJUSTMENT (HFRE) .

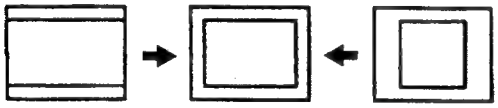
1. Input a cross-hatch signal.
2. Set the Service adjustment mode.
3. Select HPOS with 1 and 4 .
4. Adjust with 3 and 6 to the best horizontal center.
5. Write into the memory by pressing MUTING then ENTER .

H. CENTER (HPOS)

H.SIZE ADJUSTMENT (HSIZ)

1. Input a cross-hatch signal.
2. Set to service adjustment Mode.
3. Select HSIZ with 1 and 4.
4. Adjust with 3 and 6 for best horizontal size.
5. Write into the memory by pressing MUTING then ENTER .

H. SIZE (HSIZ)



V.CENTER ADJUSTMENT (VPOS)

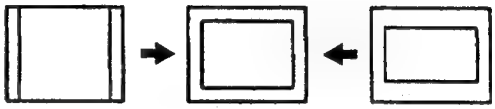
1. Input a cross-hatch signal.
2. Set to service adjustment Mode.
3. Select VPOS with 1 and 4.
4. Adjust with 3 and 6 for the best vertical senter.
5. Write into the memory by pressing MUTING then ENTER .

V. CENTER (VPOS)

V.SIZE ADJUSTMENT (VSIZ)

1. Input a cross-hatch signal.
2. Set to service adjustment Mode.
3. Select VSIZ with 1 and 4.
4. Adjust with 3 and 6 for the best vertical size.
5. Write into the memory by pressing MUTING then ENTER .

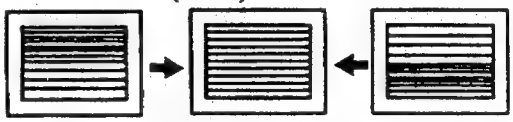
V. SIZE (VSIZ)



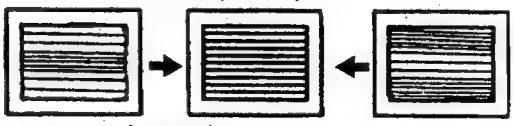
V LINEARITY(VLIN), VS CORRECTION(VSCO), PIN AMP(PAMP), CORNER PIN(CPIN), AND PIN PHASE(PPHA) ADJUSTMENTS

1. Input a cross-hatch signal.
2. Set to Service adjustment Mode.
3. Select VLIN, VSCO, PAMP, CPIN, and PPHA with 1 and 4.
4. Adjust with 3 and 6 for the best picture.
5. Write the memory byPressing MUTING then ENTER.

V LINEARITY (VLIN)

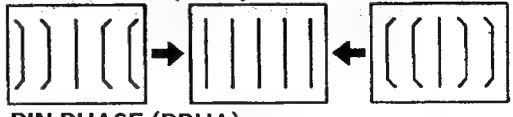


VS CORRECTION (VSCO)

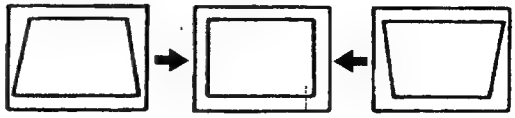


PIN AMP (PAMP)

CORNER PIN (CPIN)

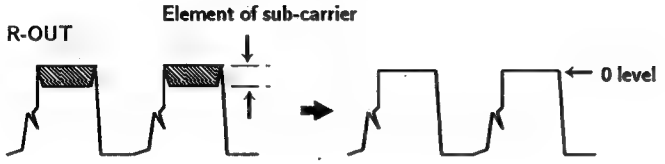


PIN PHASE (PPHA)



CROMA TRAP ADJUSTMENT (CROM)

1. Input a red signal
2. Set to Service adjustment Mode.
3. Connect an oscilloscope CN703 Pin① (R OUT) of C board ground.
4. Select CROM with 1 and 4.
5. Adjust with 3 and 6 for the 0 level.

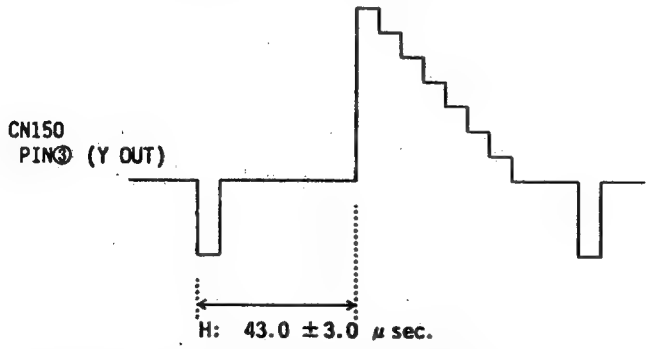


6. Write the memory by pressing MUTING then ENTER .

5-3. P BOARD ADJUSTMENTS

P IN P H. POSITION (PHPO)

1. Input a color-bar signal
2. Set to Service adjustment Mode.
3. Connect an oscilloscope CN150 Pin③ (Y OUT).
4. Select PHPO with 1 and 4.
5. Adjust with 3 and 6 for the 43.0±3.0 μsec (H).



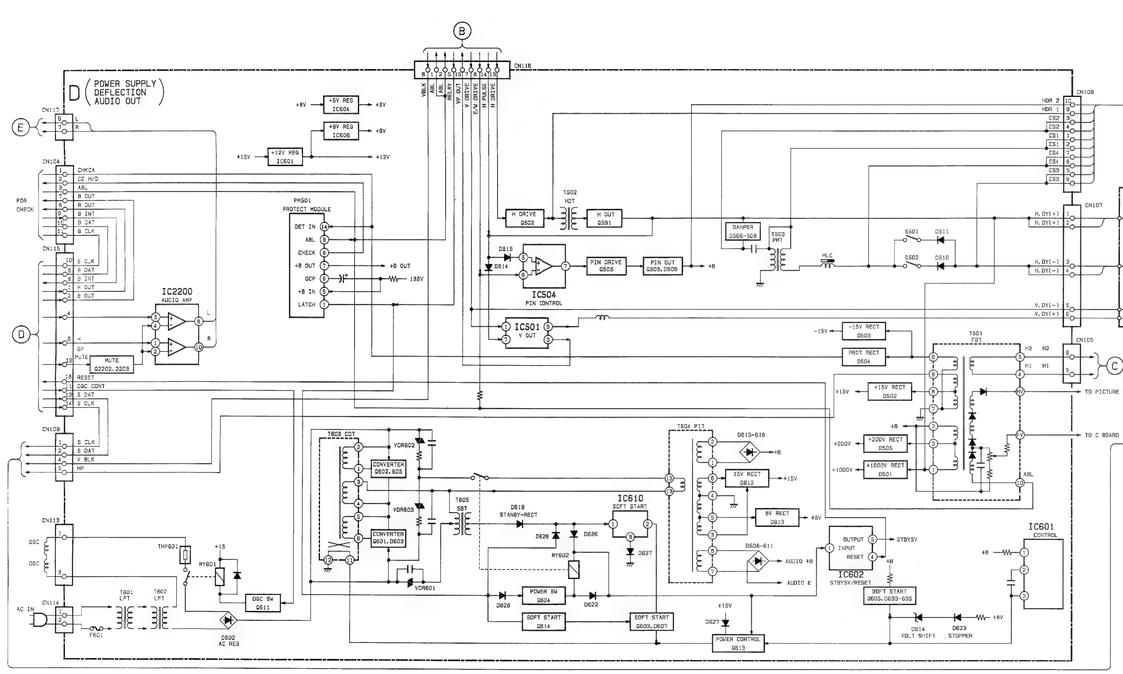
6. Write the memory by pressing MUTING then ENTER .

KV-32TW77/32TW78
KV-32TW77/32TW78
RM-Y118

KV-32TW77/32TW78
KV-32TW77/32TW78
RM-Y118

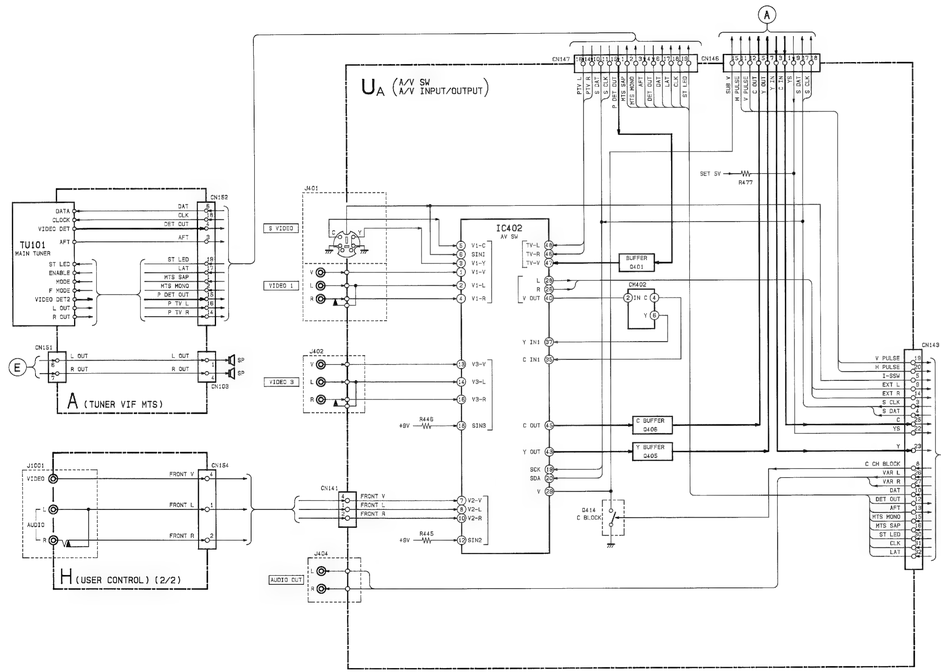
SECTION 6
DIAGRAMS

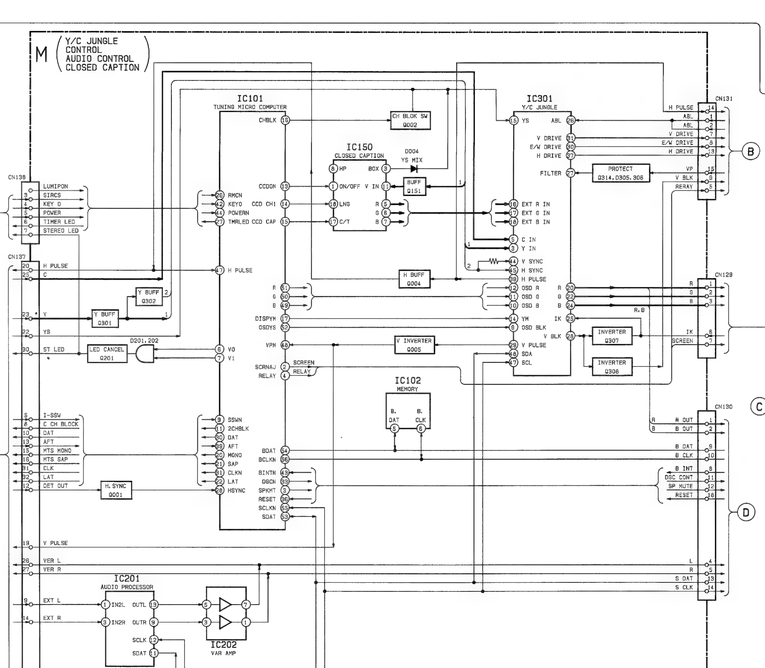
6-1. BLOCK DIAGRAMS

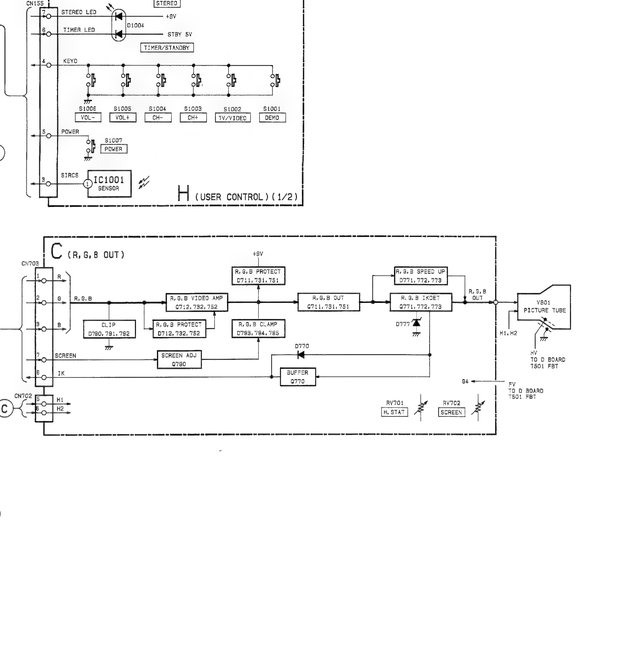


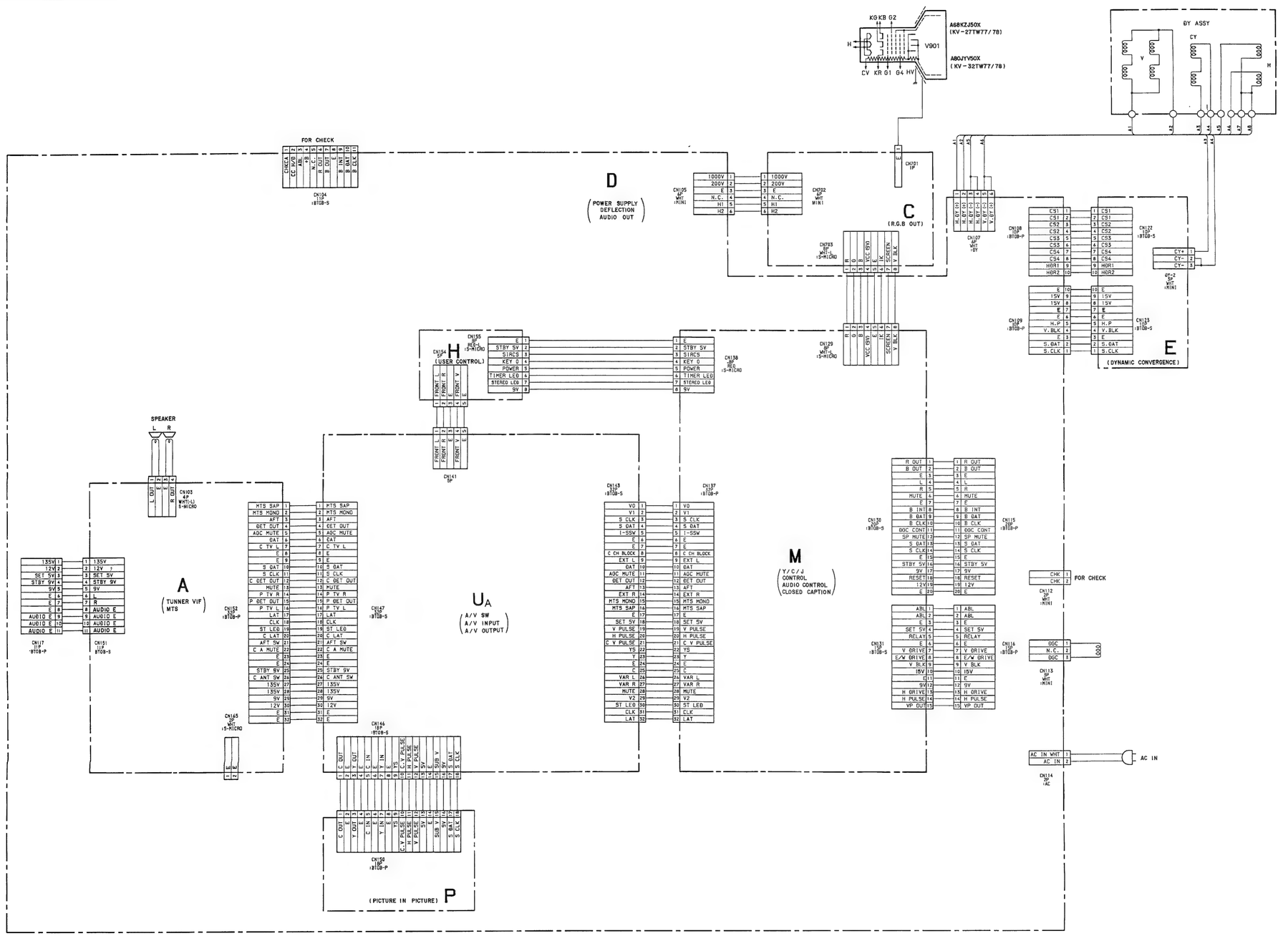
KV-27TW77/32TW78
KV-32TW77/32TW78
RM-Y118

KV-27TW77/32TW78
KV-32TW77/32TW78
RM-Y118

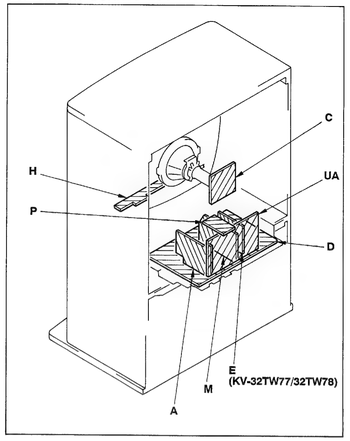








6-3. CIRCUIT BOARDS LOCATION



6-4. SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF
  50 WV or less are not indicated except for electrolytic and tantalums.
- All resistors are in ohms.
  kΩ =1000Ω , MΩ =1000kΩ
- Indication of resistance, which does not have one for rating electrical power, is as follows.

Pitch: 5 mm
Rating electrical power ¼ W

- : nonflammable resistor.
- : fusible resistor.
- : internal component.
- : panel designation, or adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : earth-chassis.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Reference information

RESISTOR	: RN	METAL FILM
	: RC	SOLID
	: FPRD	NONFLAMMABLE CARBON
	: FUSE	NONFLAMMABLE FUSIBLE
	: RS	NONFLAMMABLE METAL OXIDE
	: RB	NONFLAMMABLE CEMENT
	: RW	NONFLAMMABLE WIREWOUND
	: ※	ADJUSTMENT RESISTOR
COIL	: LF-8L	MICRO INDUCTOR
CAPACITOR	: TA	TANTALUM
	: PS	STYROL
	: PP	POLYPROPYLENE
	: PT	MYLAR
	: MPS	METALIZED POLYESTER
	: MPP	METALIZED POLYPROPYLENE
	: ALB	BIPOLAR
	: ALT	HIGH TEMPERATURE
	: ALR	HIGH RIPPLE

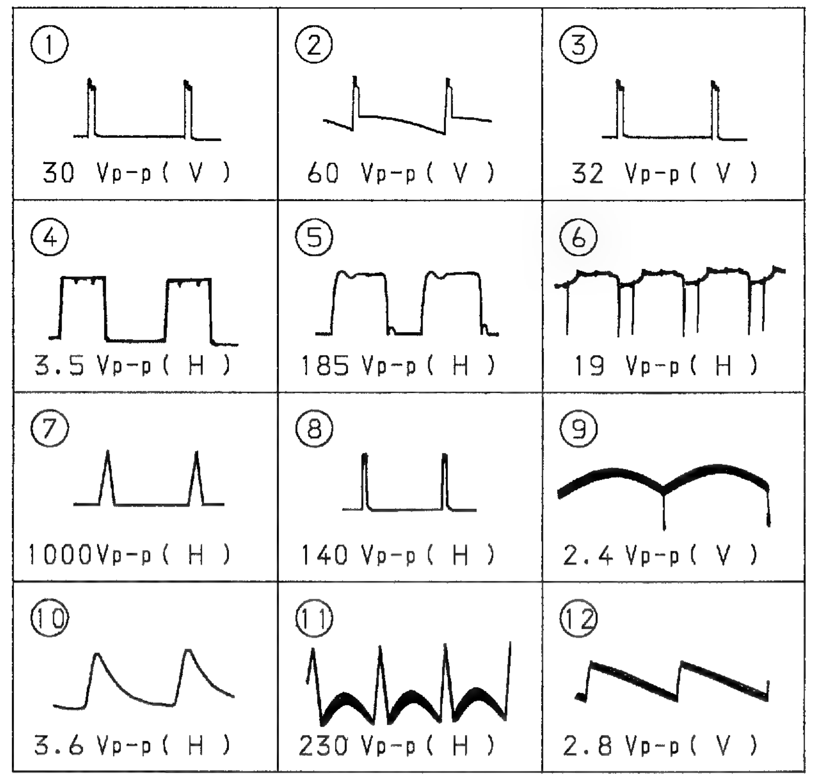
- Readings are taken with a color-bar signal input.
- Readings are taken with a 10MΩ digital multimeter.
- Voltage are dc with respect to ground unless otherwise noted.
- Voltage variations may be noted due to normal production tolerances.
- All voltages are in V.
- Circled numbers are waveform references.
- : B+ bus.
- : signal path. (RF)
- The components identified by ⧫ in this basic schematic diagram have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by ◪ , make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by ⧫ and repeat the adjustment until the specified value is achieved. (Refer to R511, R524 adjustment on page 39.)
- When replacing the part in below table, be sure to perform the related adjustment.

Part replaced (◪)	Adjustment (⧫)
PM501, R511, R632, R645, R650	R511
IC601, PM501, D504, R509, R524, R634, R635, T501	R524

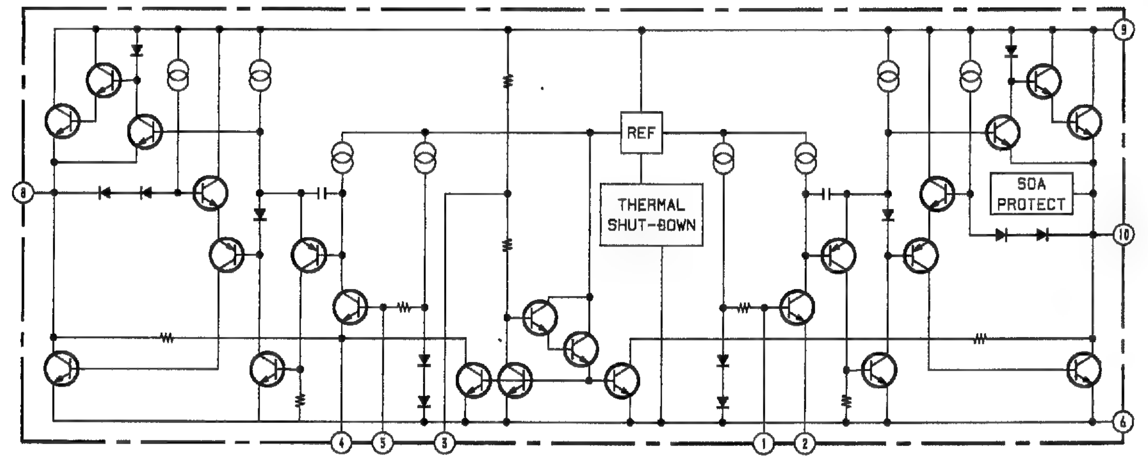
(1) Schematic Diagram of D Board

• D BOARD WAVEFORMS

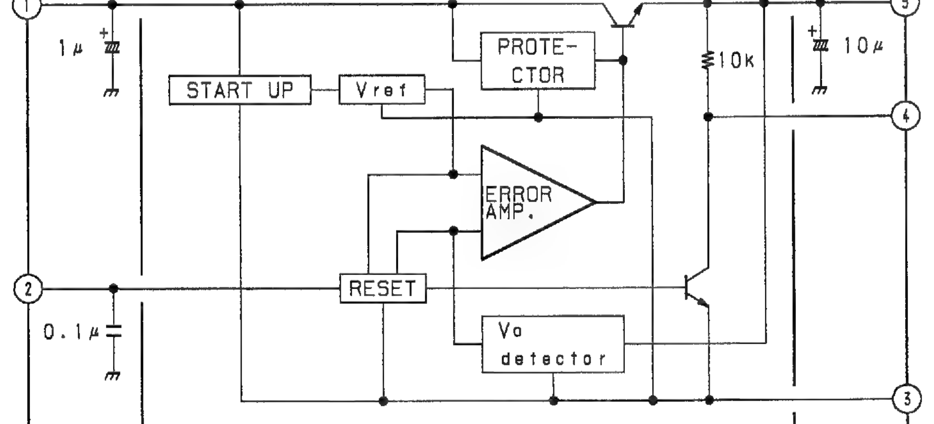
B-SS4442<U..>- Ð <WAVELIST>



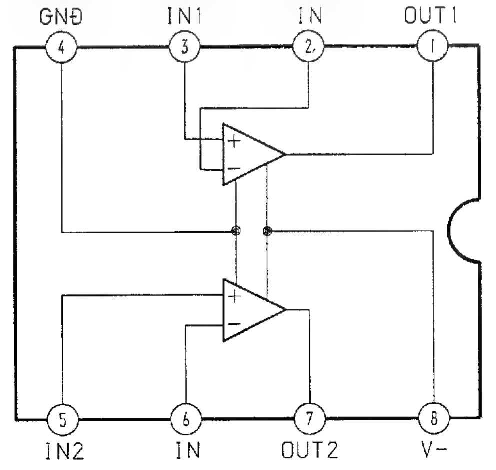
D Board IC2200 TDA2009A



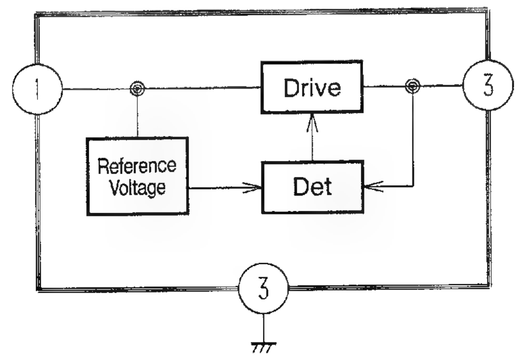
D Board IC602 L78LR05D-MA

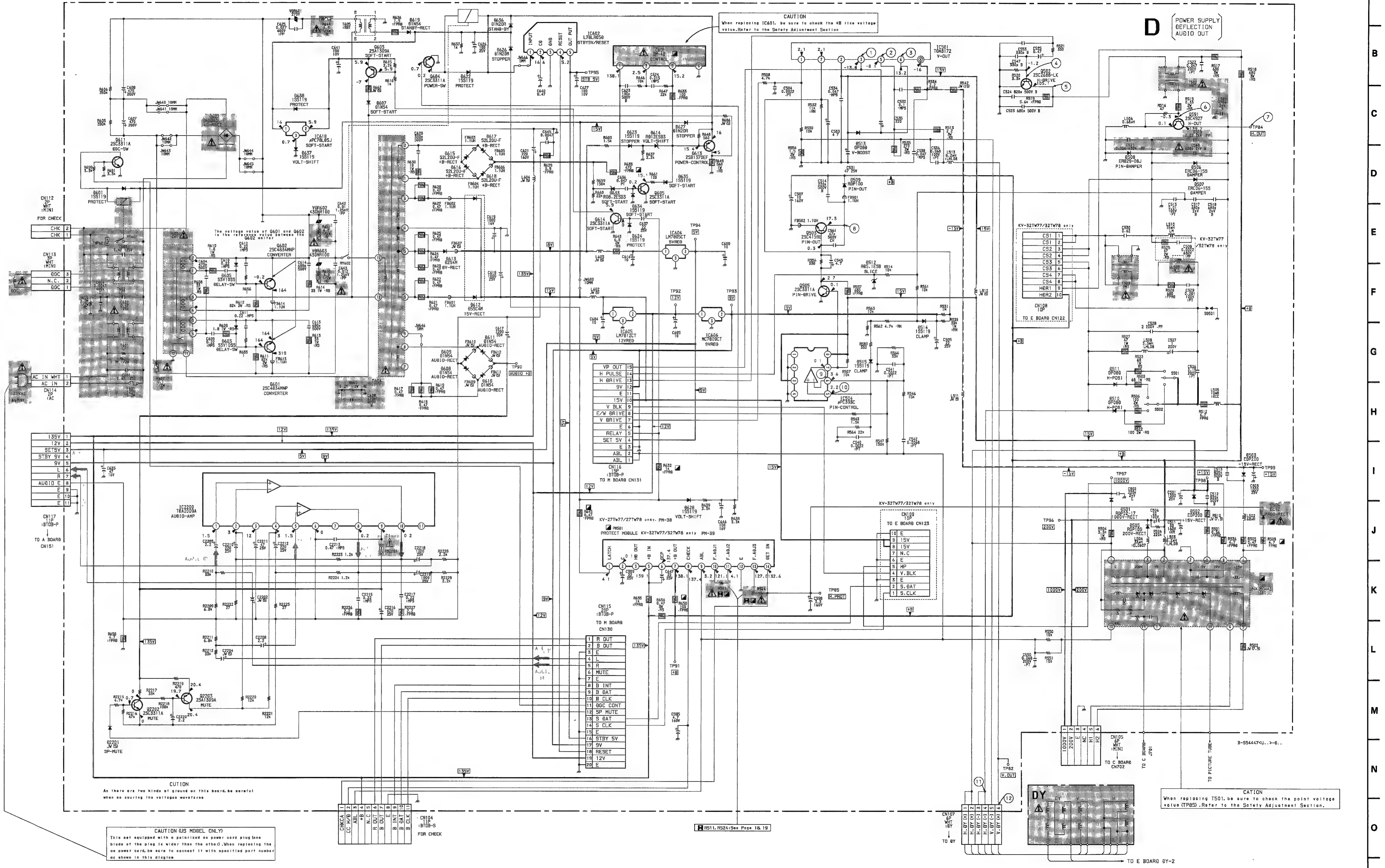


D Board IC504 μPC393C



D Board IC610 μPC78L05J

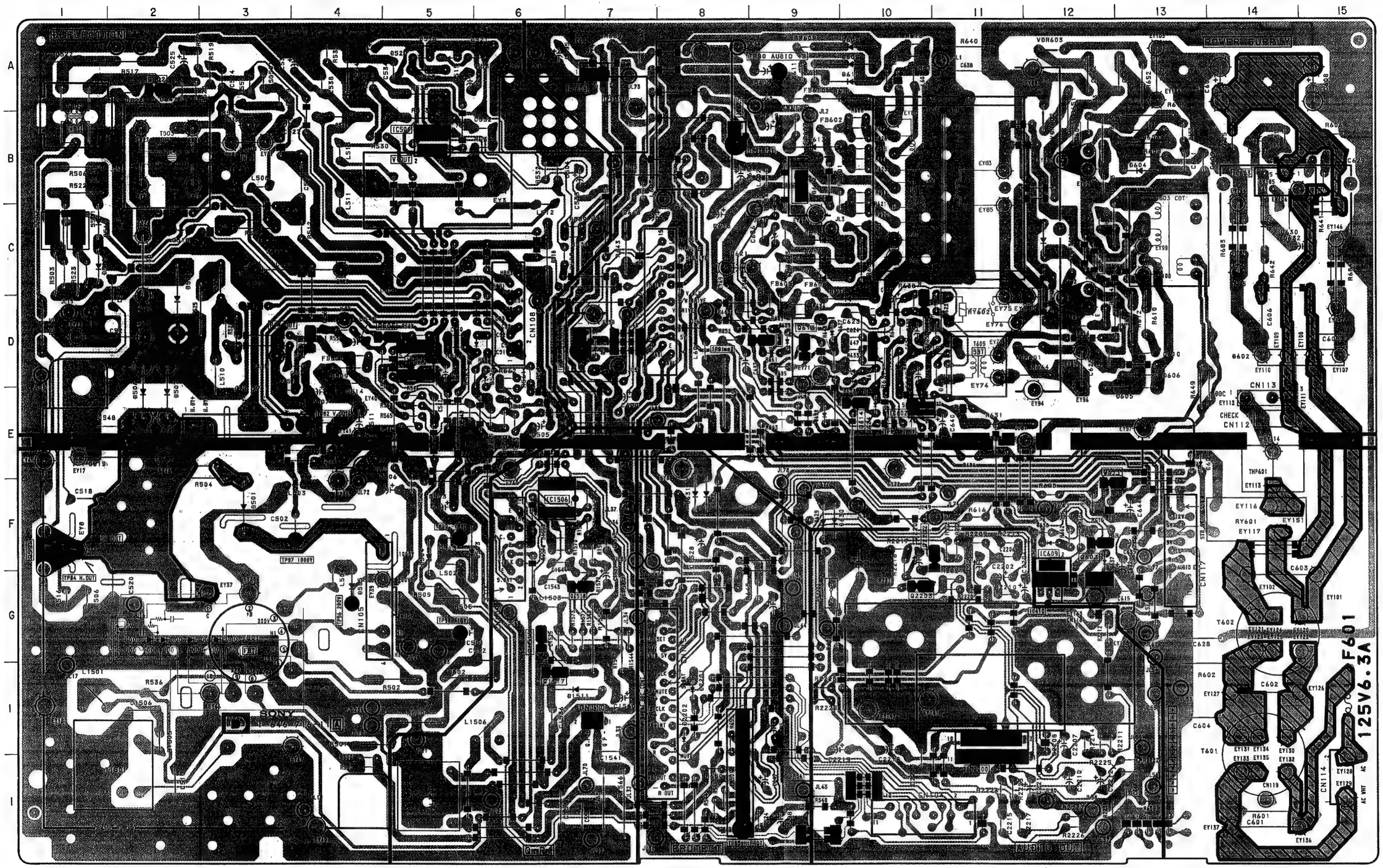




KV-27TW77/27TW78
KV-32TW77/32TW78
RM-Y118

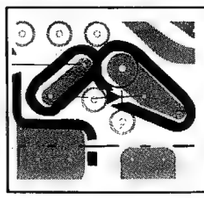
D [POWER SUPPLY
DEFLECTION
AUDIO OUT]

– D Board –



• D BOARD

IC		DIODE	
IC501	B – 5	D501	F – 3
IC504	D – 5	D502	H – 5
IC601	D – 10	D503	F – 5
IC602	E – 10	D504	F – 5
IC604	D – 7	D505	G – 4
IC605	B – 8	D506	E – 2
IC606	A – 7	D507	E – 2
IC610	G – 12	D508	D – 2
IC2200	I – 11	D509	D – 4
		D510	C – 1
		D511	C – 1
		D512	D – 7
		D513	A – 5
		D514	E – 6
		D515	D – 6
TRANSISTOR		D601	E – 13
		D602	D – 14
Q502	A – 2	D603	B – 13
Q503	D – 4	D605	E – 13
Q505	D – 5	D607	F – 12
Q591	F – 1	D608	A – 10
Q601	B – 12	D609	A – 10
Q602	C – 12	D610	A – 10
Q603	F – 12	D611	A – 10
Q604	D – 10	D612	B – 9
Q605	D – 9	D613	B – 9
Q611	F – 12	D614	D – 10
Q613	D – 9	D615	C – 9
Q614	E – 10	D616	C – 9
Q2202	F – 10	D617	C – 9
Q2203	G – 10	D618	D – 10
		D619	D – 10
		D622	D – 11
		D623	D – 10
		D624	E – 10
		D626	D – 10
		D627	D – 9
		D628	E – 9
		D629	F – 9
		D630	F – 9
		D631	F – 8
		D632	F – 8
		D633	C – 9
		D634	C – 9
		D635	D – 9
		D636	D – 11
		D637	F – 12
		D638	F – 12

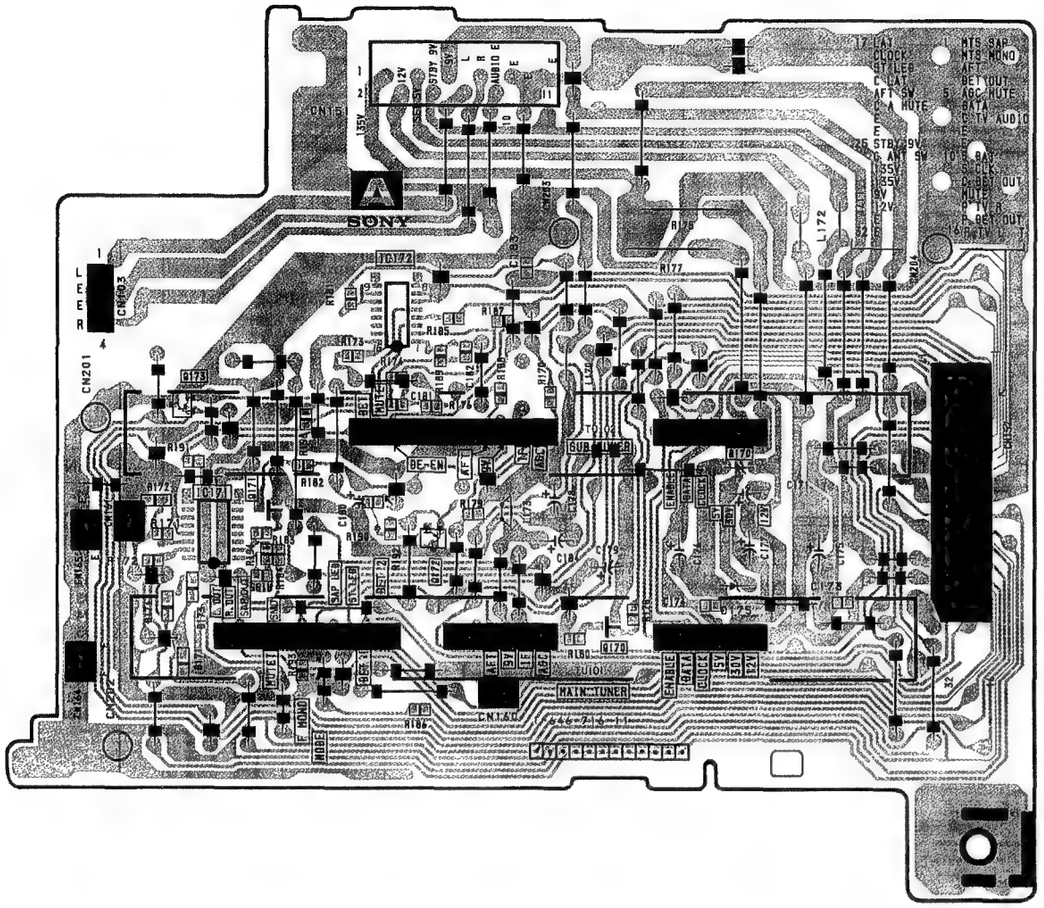


NOTE:
The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.

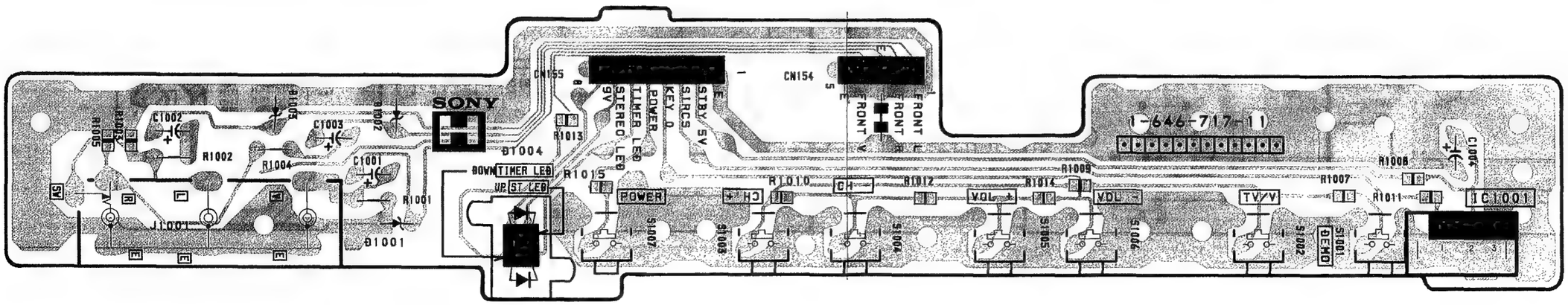
KV-27TW77/27TW78
KV-32TW77/32TW78
RM-Y118

A [TUNER VIF, MTS] H [USER CONTROL]

– A Board –

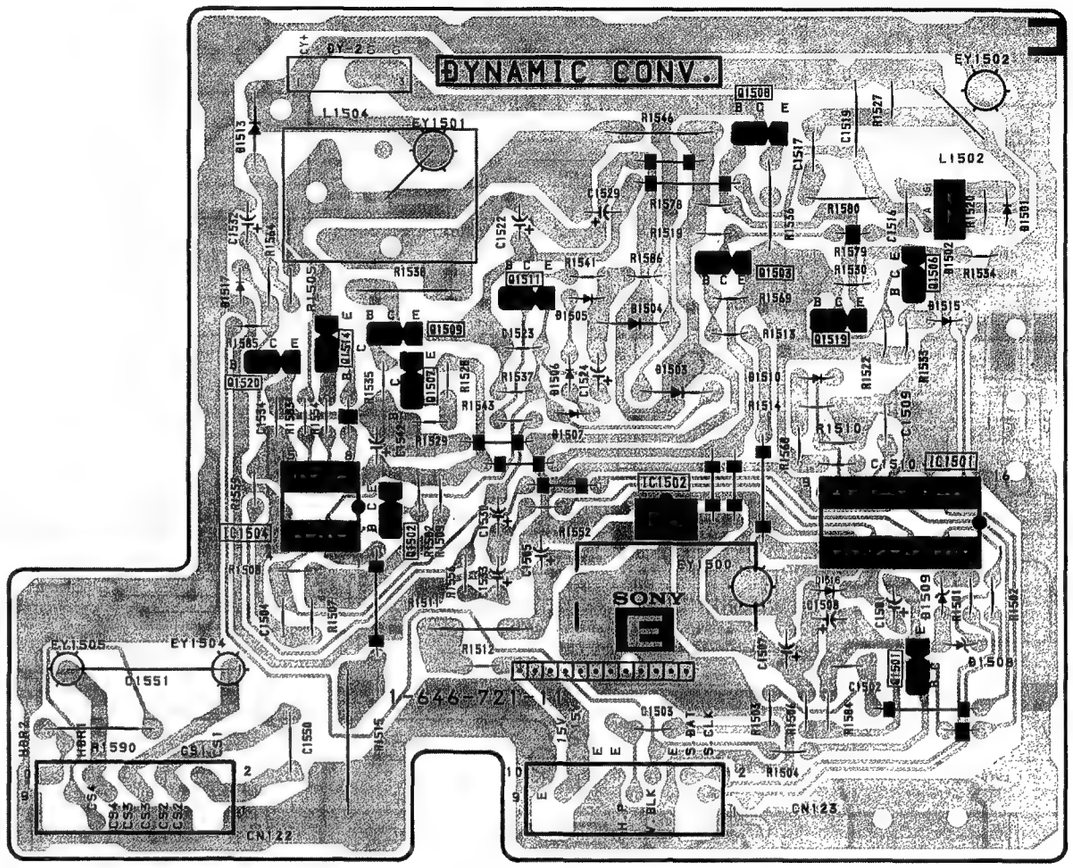


– H Board –

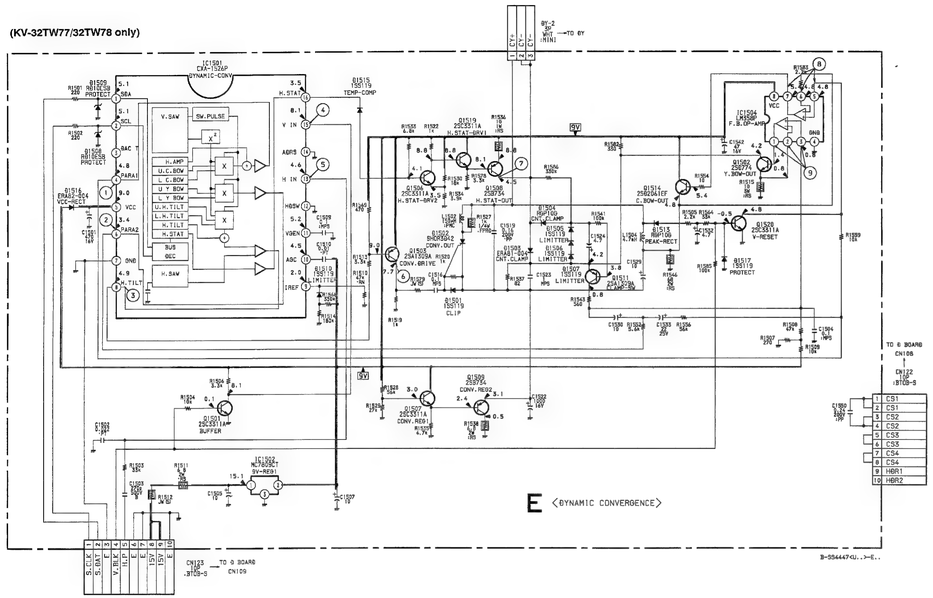


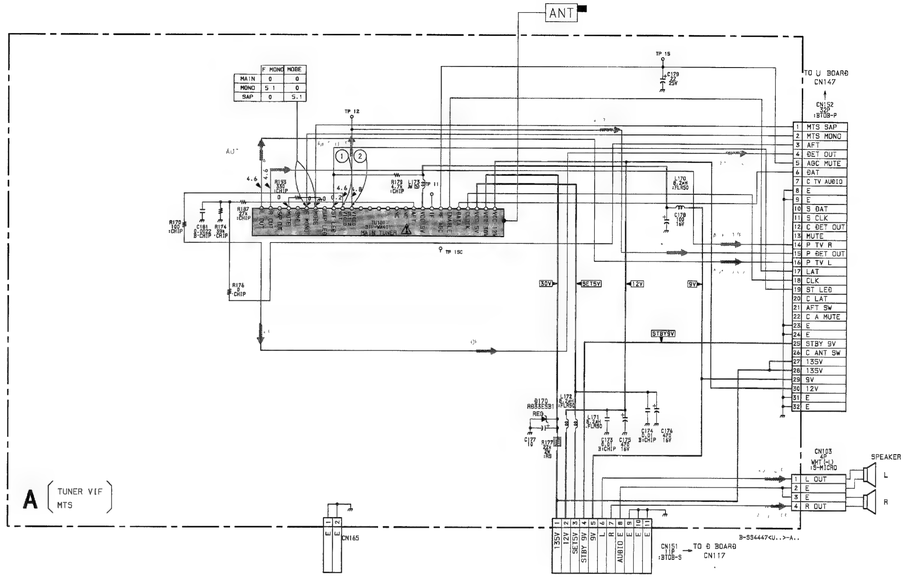
E [DYNAMIC CONVERGENCE]

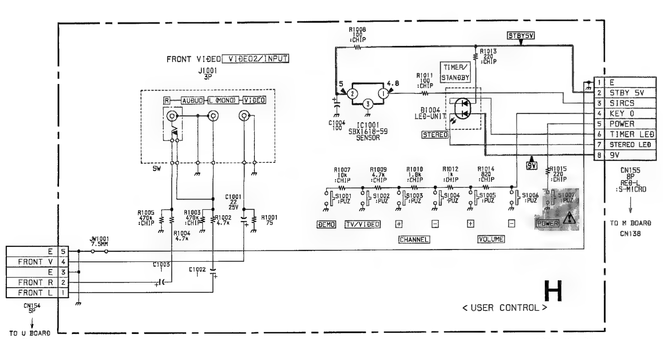
– E Board (KV-32TW77/32TW78 only) –



(KV-32TW77/32TW78 only)







• E BOARD WAVEFORMS

B-SS4442<U..>-E <WAVELIST>

① 1.2 Vp-p (V)	② 2.6 Vp-p (V)	③ 9.2 Vp-p (H)
④ 9.2 Vp-p (V)	⑤ 1.6 Vp-p (H)	⑥ 4.4 Vp-p (H)
⑦ 2.2 Vp-p (V)	⑧ 1 Vp-p (V)	⑨ 2 Vp-p (V)

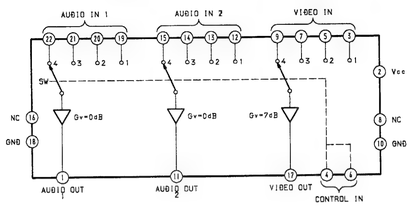
• A BOARD WAVEFORMS

B-SS4439<U..>- A <WAVELIST>

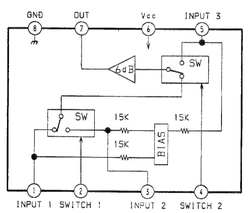
① 2.6 Vp-p (H)	② 2.5 Vp-p (H)

(3) Schematic Diagram of UA Board

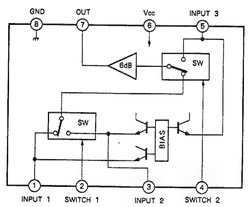
UA Board IC401 M5470AP



UA Board IC403 MM1114XFF



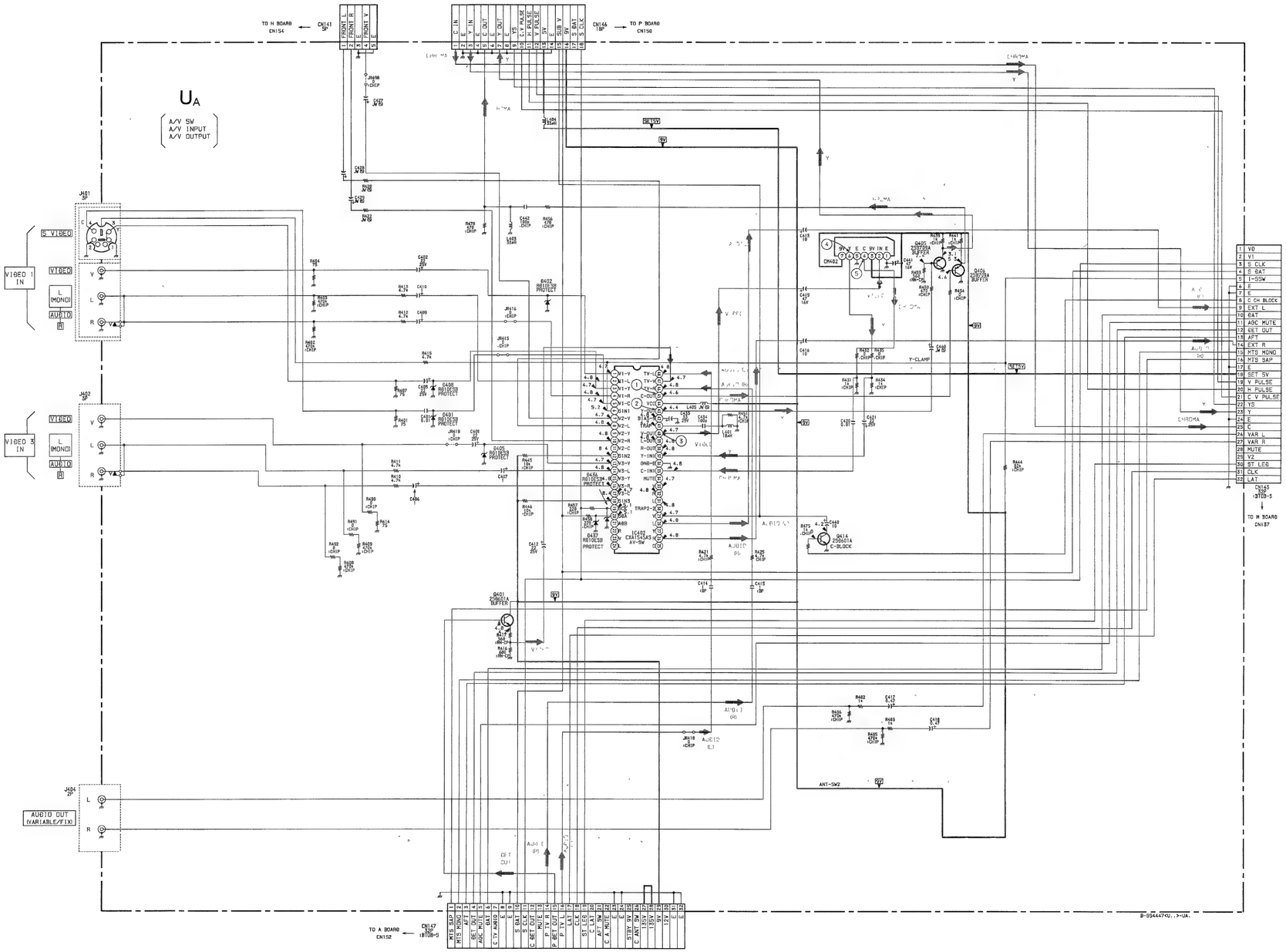
UA Board IC404 MM1118XFF



• **UA BOARD WAVEFORMS**

B-SS4442KU..>-UA<WAVELIST>

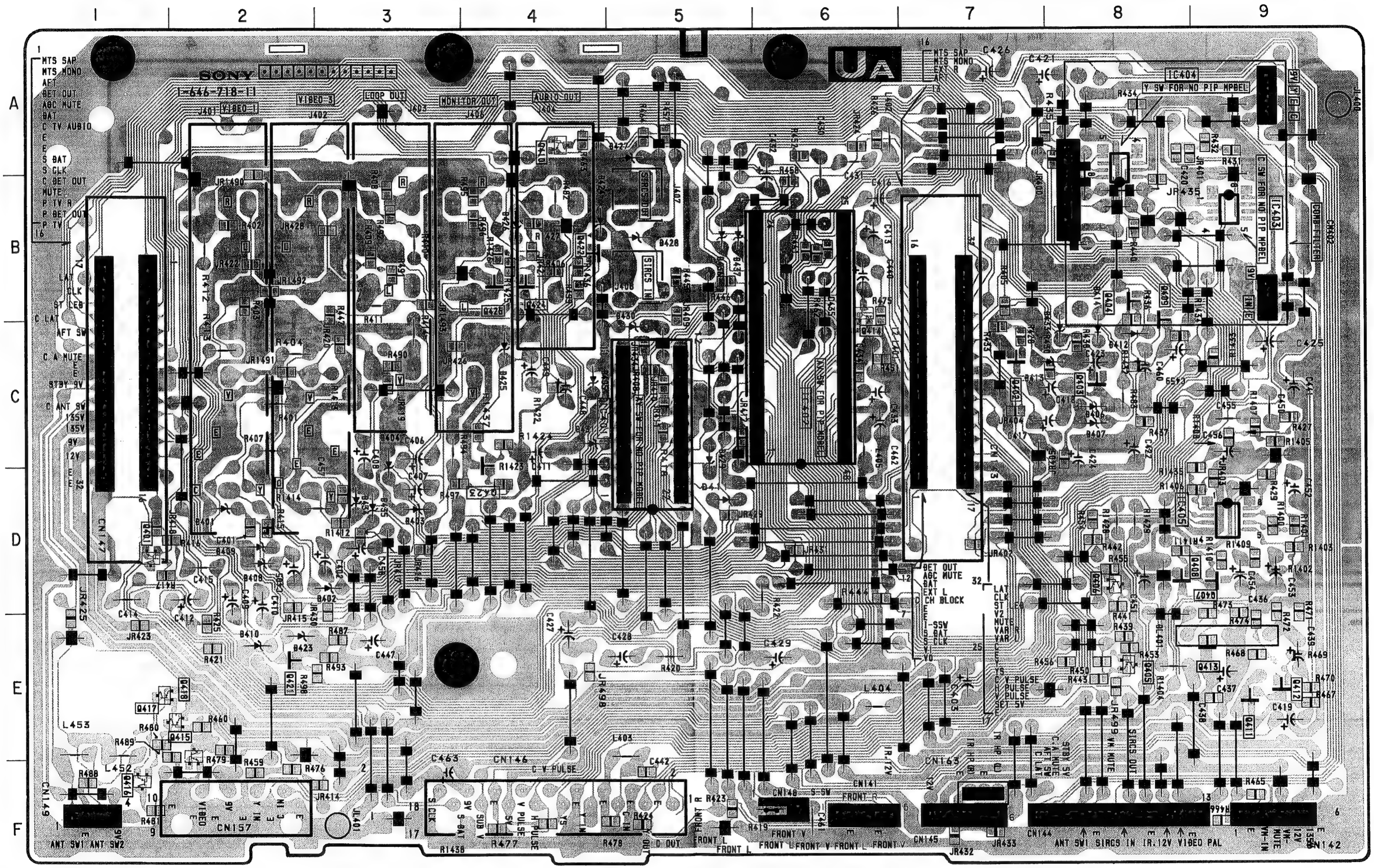
① 2.2 Vp-p (H)	② 2.3 Vp-p (H)	③ 2.6 Vp-p (H)
④ 2.4 Vp-p (H)	⑤ 2.6 Vp-p (H)	



KV-27TW77/27TW78
KV-32TW77/32TW78
RM-Y118

UA [A/V SW, A/V INPUT, A/V OUTPUT]

– UA Board –

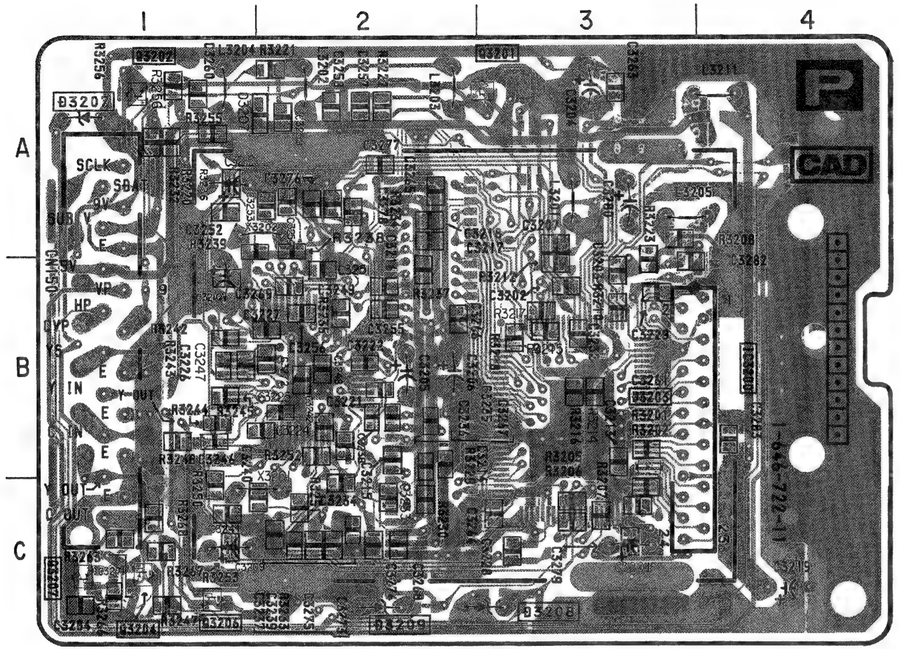


• **UA BOARD**

IC	
IC402	C – 5
TRANSISTOR	
Q401	D – 1
Q405	E – 8
Q406	D – 8
Q414	B – 6
DIODE	
D401	D – 2
D402	D – 3
D405	C – 4
D408	D – 2
D436	B – 5
D437	B – 5

P [PICTURE IN PICTURE]

– P Board (Conductor Side) –



• : Pattern on the side which is seen.
• : Pattern of the rear side.

• P BOARD

IC	(Conductor Side)	(Component Side)
IC3200	B – 4	B – 1
IC3201		B – 2
IC3202		B – 3
IC3203		A – 3
IC3204		B – 3
IC3205		B – 1

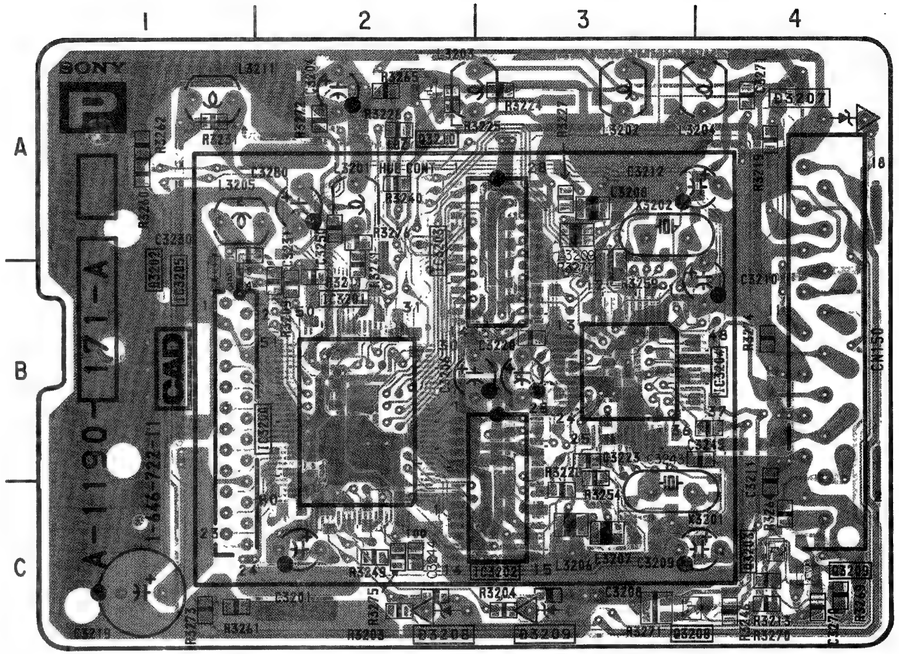
TRANSISTOR	(Conductor Side)	(Component Side)
Q3201	A – 3	
Q3202	A – 1	
Q3203	B – 3	C – 4
Q3204	C – 1	
Q3206	C – 1	
Q3207	C – 1	
Q3208		C – 3
Q3209		C – 4
Q3210		A – 2

DIODE	(Conductor Side)	(Component Side)
D3202		B – 1
D3203		B – 3
D3208	C – 3	C – 2
D3209	C – 2	C – 3

CRYSTAL	(Conductor Side)	(Component Side)
X3201	C – 2	C – 3
X3202	A – 2	A – 3

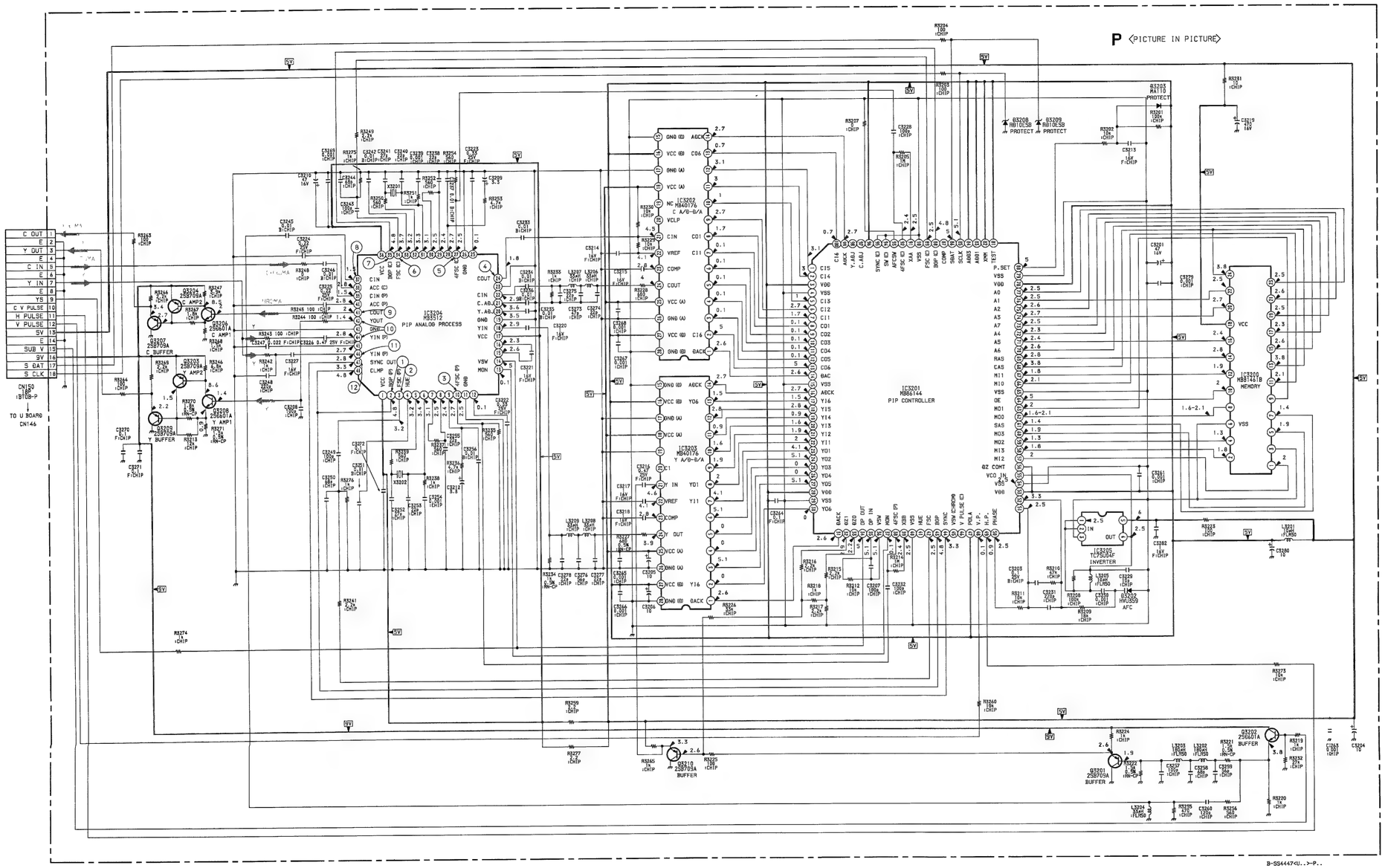
KV-27TW77/27TW78
KV-32TW77/32TW78
RM-Y118

– P Board (Component Side) –

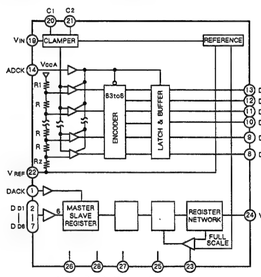


• : Pattern on the side which is seen.
• : Pattern of the rear side.

(4) Schematic Diagram of P Board



P Board IC3202, IC3203 MB40176

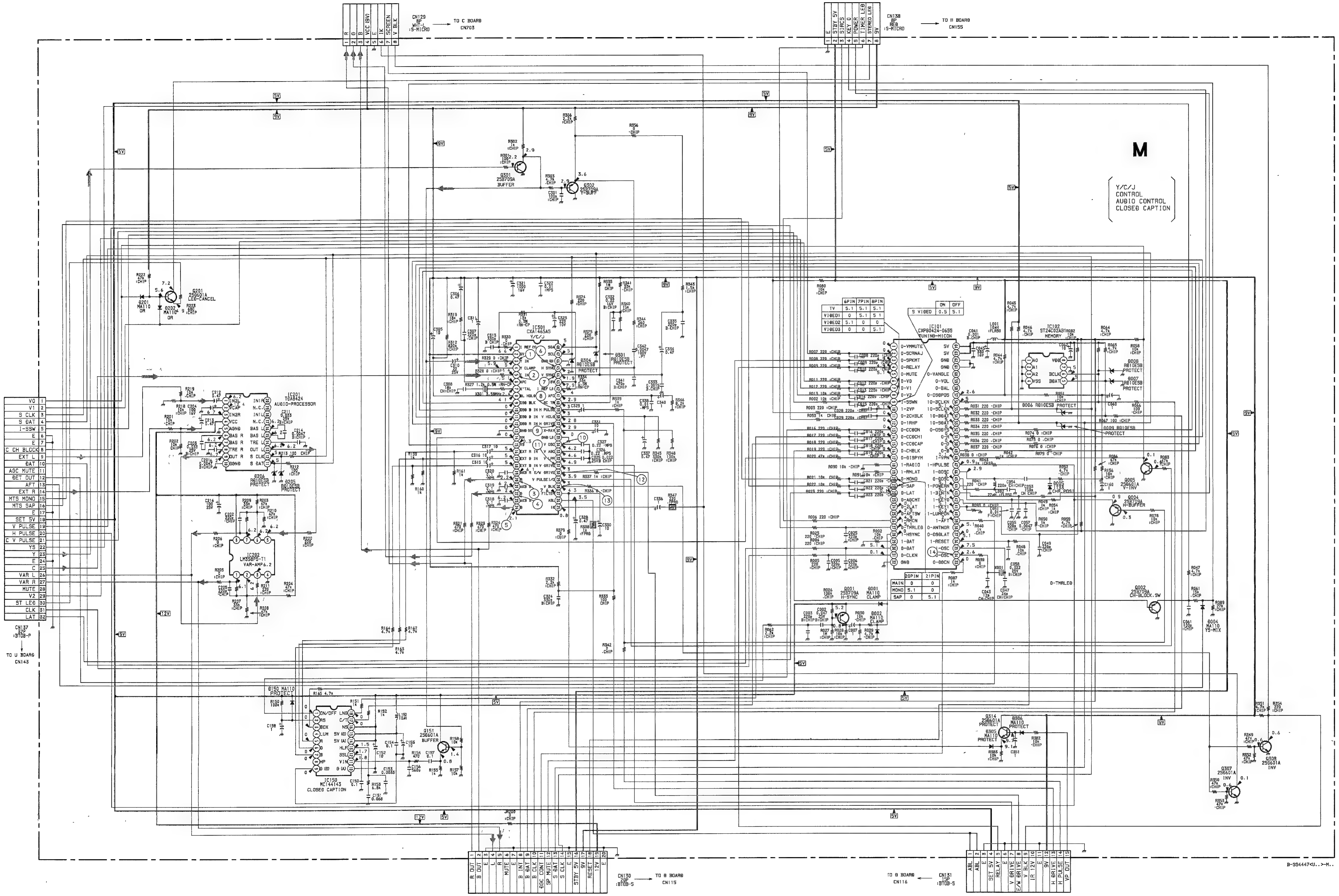


• P BOARD WAVEFORMS

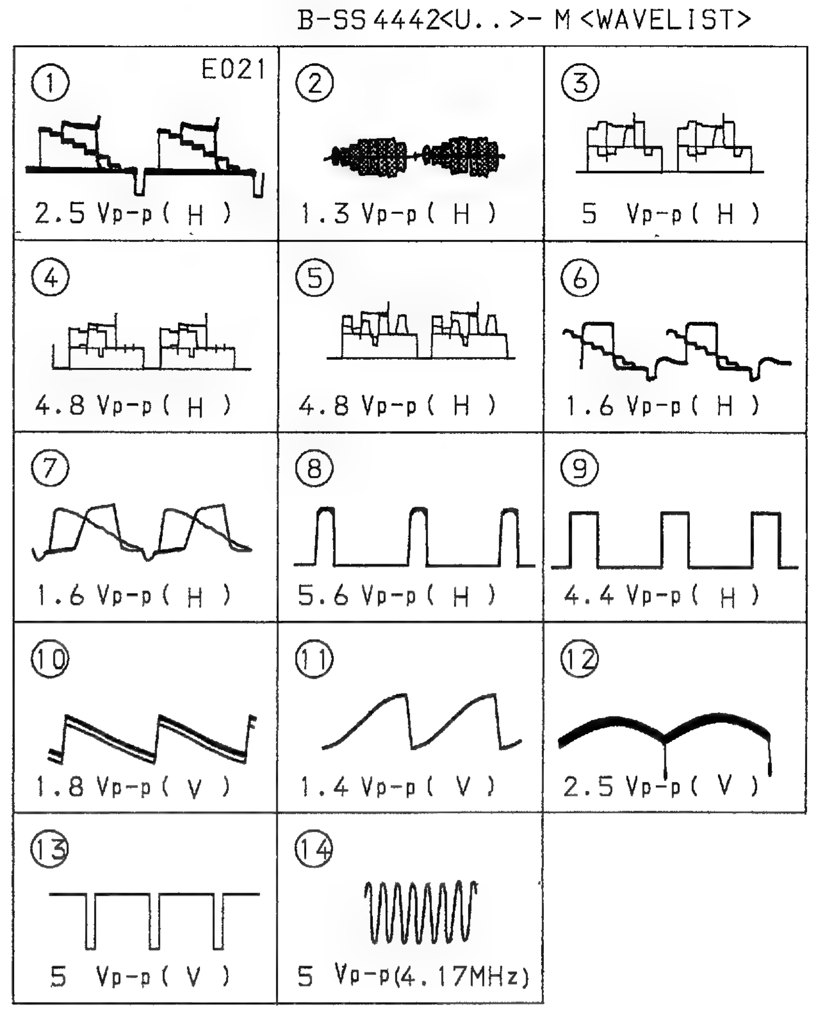
B-SS4442<U..>- P <WAVEL!ST>

① 5.2 Vp-p (H)	② 1.2Vp-p(3.58MHz)	③ 3.6Vp-p (14.32MHz)
④ 0.8 Vp-p (H)	⑤ 3.5Vp-p(4.3MHz)	⑥ 1.2Vp-p(3.58MHz)
⑦ 5.2 Vp-p (H)	⑧ 1 Vp-p (H)	⑨ 0.7 Vp-p (H)
⑩ E021 1.3 Vp-p (H)	⑪ E021 1 Vp-p (H)	⑫ 5 Vp-p (H)

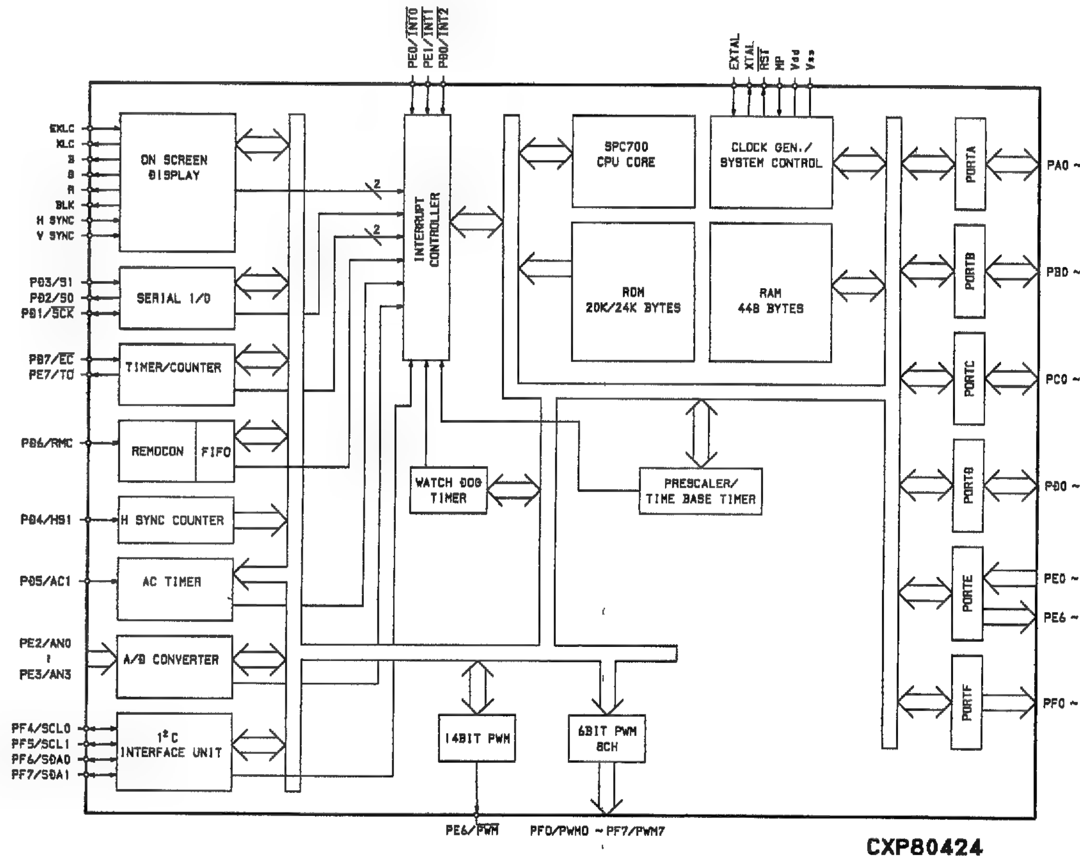
(5) Schematic Diagram of M Board



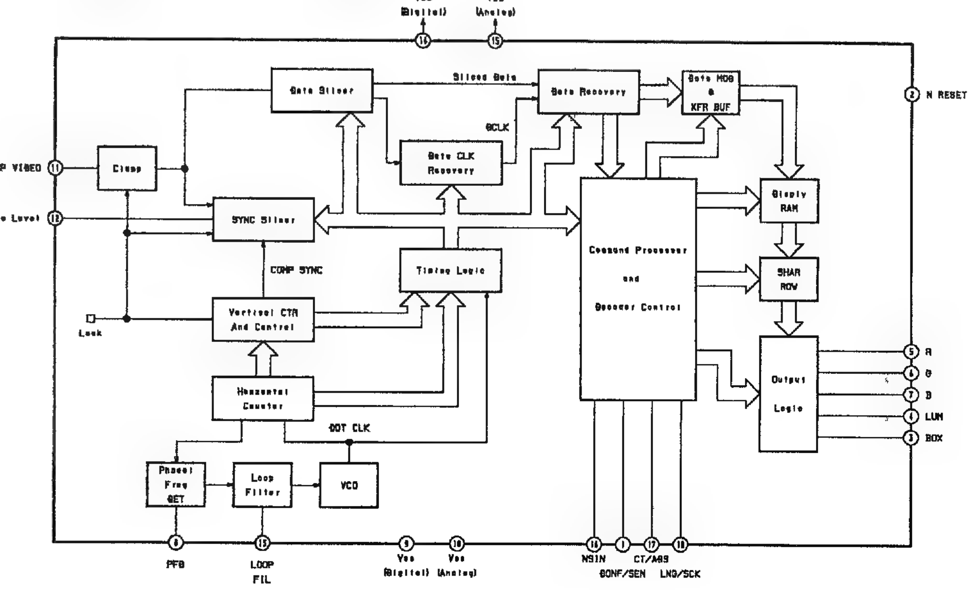
• M BOARD WAVEFORMS



M Board IC101 CXP80424-065S



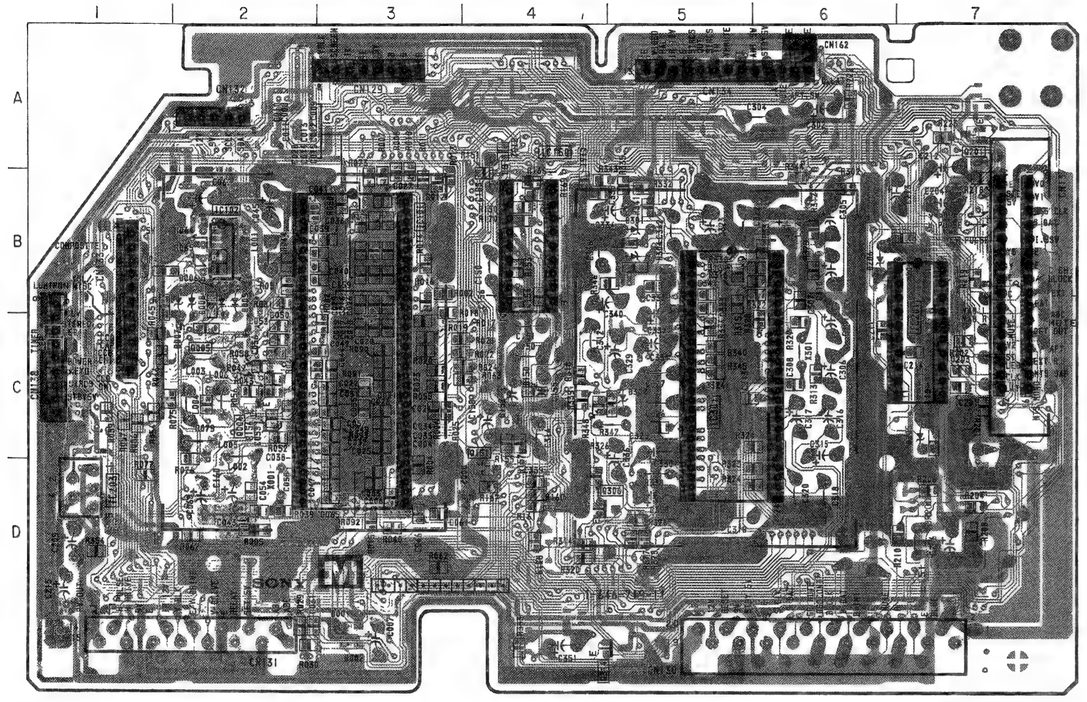
M Board IC150 Z8612812PSC



KV-27TW77/27TW78
KV-32TW77/32TW78
RM-Y118

M Y/C/J CONTROL
AUDIO CONTROL
CLOSED CAPTION

– M Board (Conductor Side) –



• : Pattern on the side which is seen.
• : Pattern of the rear side.

• M BOARD

IC

	(Conductor Side)	(Component Side)
IC101	C – 3	B – 5
IC102	B – 2	B – 7
IC150	B – 4	B – 4
IC201		B – 2
IC202		D – 1
IC301	B – 5	B – 3

TRANSISTOR

	(Conductor Side)	(Component Side)
Q001		D – 6
Q002	D – 4	
Q004	C – 2	D – 4
Q005	C – 2	
Q151	D – 4	
Q201	A – 7	
Q301		A – 2
Q302		A – 2
Q307		D – 4
Q308		D – 3
Q314	D – 5	

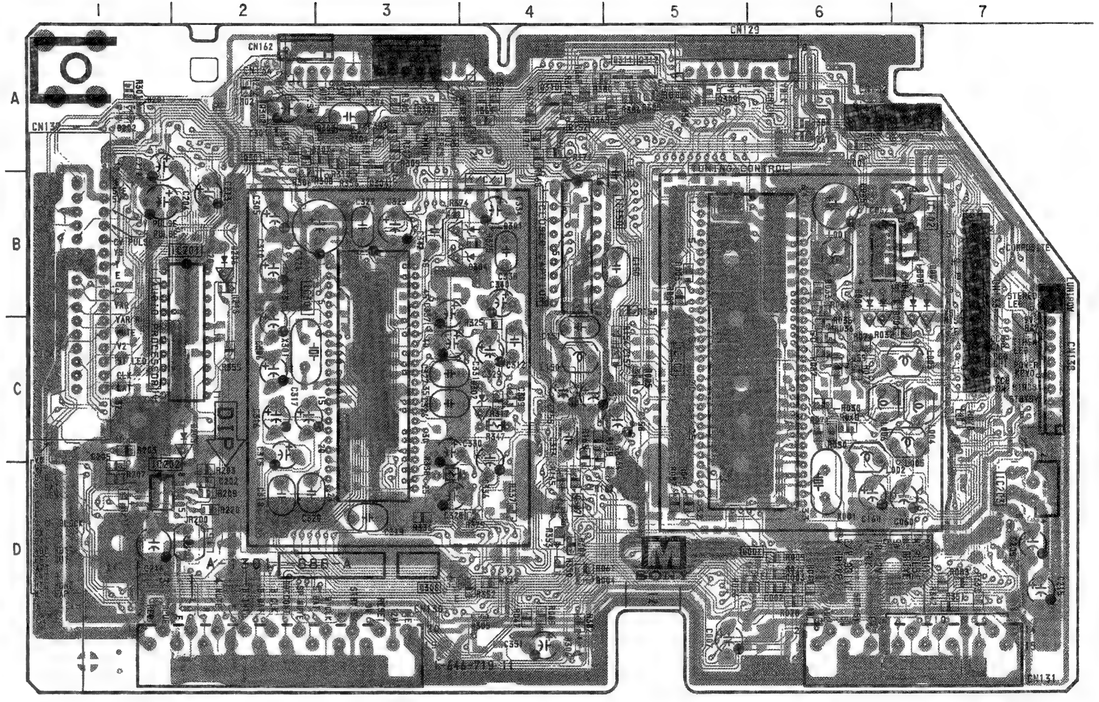
DIODE

	(Conductor Side)	(Component Side)
D001	D – 3	
D002	D – 3	
D004		D – 4
D005	D – 2	
D006	B – 2	B – 6
D007	B – 2	B – 7
D008	B – 2	B – 7
D009	B – 2	B – 6
D150	C – 4	
D201		A – 1
D202		A – 1
D205	C – 7	C – 2
D206	B – 6	B – 2
D301	B – 5	B – 4
D304	B – 5	B – 4
D305		D – 4
D306		D – 4

CRYSTAL

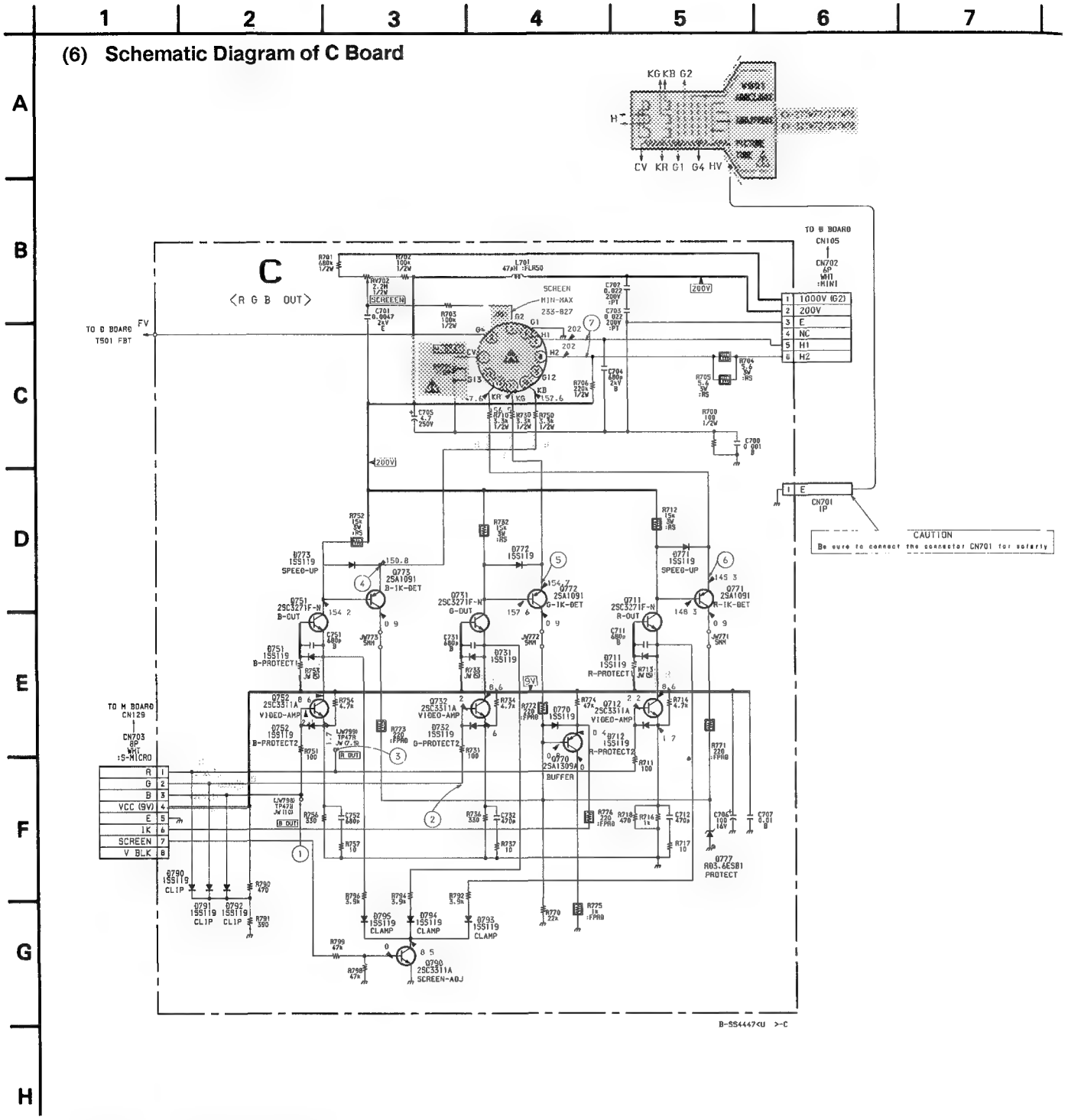
	(Conductor Side)	(Component Side)
X001	D – 2	D – 6
X301	C – 6	C – 2

– M Board (Component Side) –



• : Pattern on the side which is seen.
• : Pattern of the rear side.

(6) Schematic Diagram of C Board



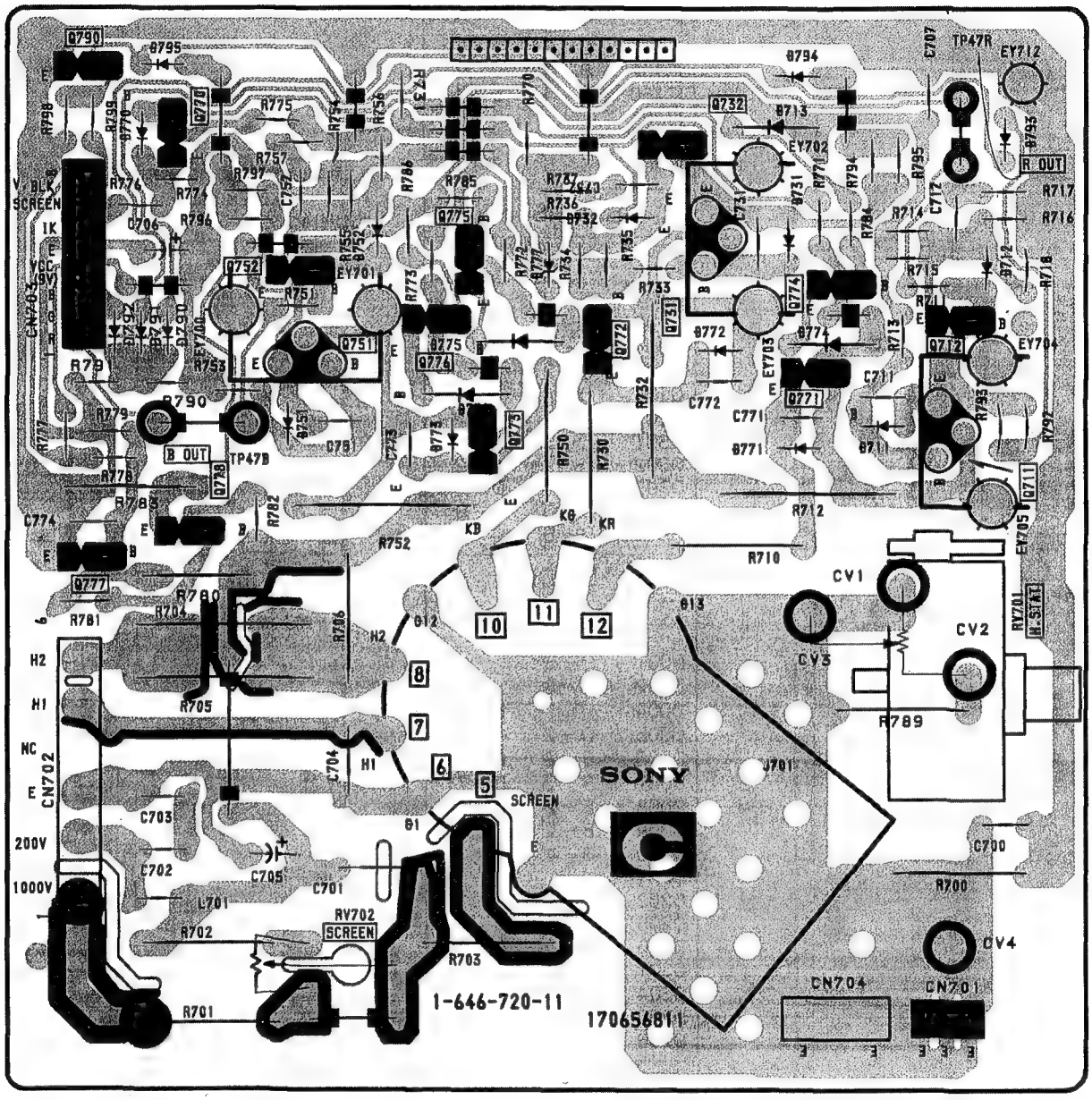
• C BOARD WAVEFORMS

B-SS4439<U.'. >- C <WAVELIST>

① 5.4 Vp-p (H)	② 5.6 Vp-p (H)	③ 5.6 Vp-p (H)	
④ 175 Vp-p (H)	⑤ 180 Vp-p (H)	⑥ 185 Vp-p (H)	⑦ 25 Vp-p (H)

C [R, G, B OUT]

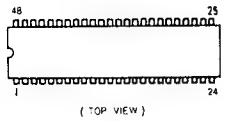
– C Board –



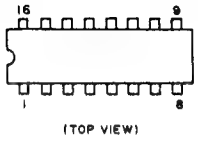
NOTE:
The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.

6-5. SEMICONDUCTORS

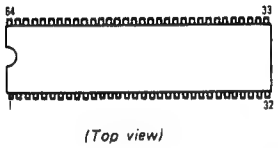
CXA1465AS
CXA1545AS



CXA1526P

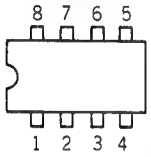


CXP80424-065S



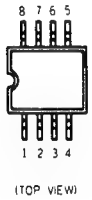
(Top view)

LM358P
ST24C02AB1
μPC358C
μPC393C

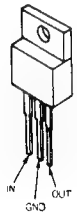


(Top view)

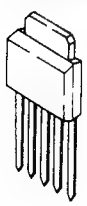
LM358PS



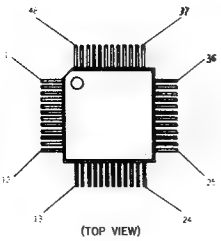
LM7805CT
LM7812CT
MC7809CT
RC7809FA



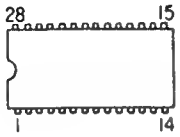
L78LR05D-MA



MB3512PF-EF



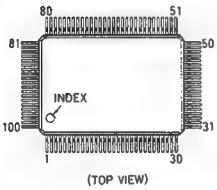
MB40176PF-G-BND-EF



(Top view)

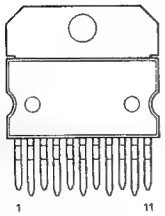
MB81461B-12RS-PSZ

MB86144

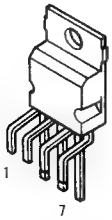


RC78L05A
μPC78L05J

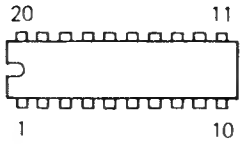
TDA2009A



TDA8172

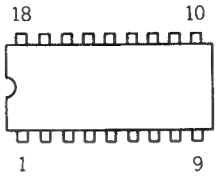


TDA8424



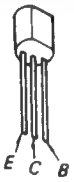
(Top view)

Z8612812PSC

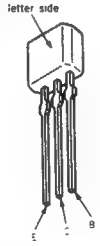


(Top view)

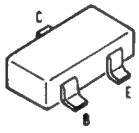
2SA1091-O
2SA1091-R



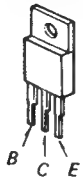
2SA1175-HFE
2SA1309A
2SC2785-HFE
2SC3311A



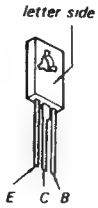
2SB709A-Q
2SB734-34
2SD601A-Q
2SD774-34



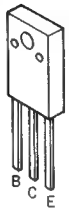
2SB1370-EF
2SC4159-E
2SD2012
2SD2061-EF



2SC2688-LK



2SC4834MNP



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2SC4927-02

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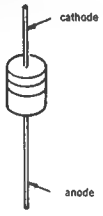
D1N20R
ERA81-004
ERA82-004
ERA83-006
ERA85-009
RD10ES-B
RD10ES-B2
RD12ES-B3
RD13ES-B2
RD3.6ES-B1
RD33ES-B1
RD5.1ES-B1
RD8.2ES-B3
1SS119



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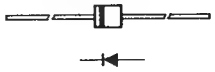
D2S4MF



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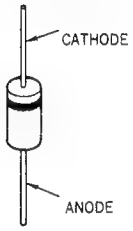
RGP10GPKG3



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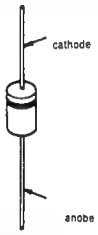
S2L20UF
S3V10SS



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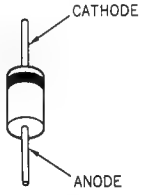
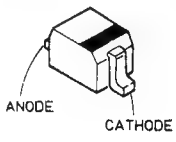


MA110



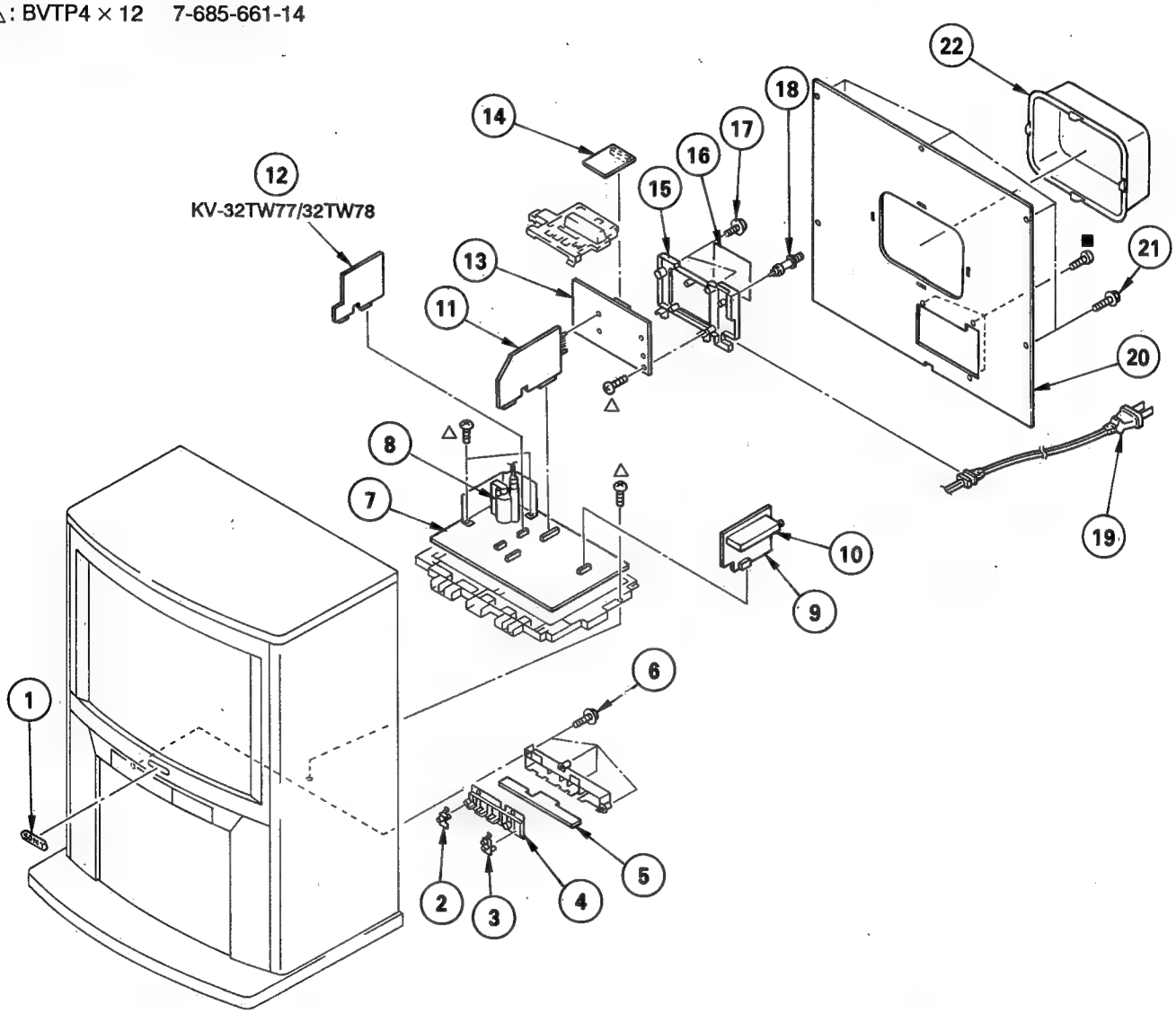
SECTION 7
EXPLODED VIEWS

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

7-1. CHASSIS

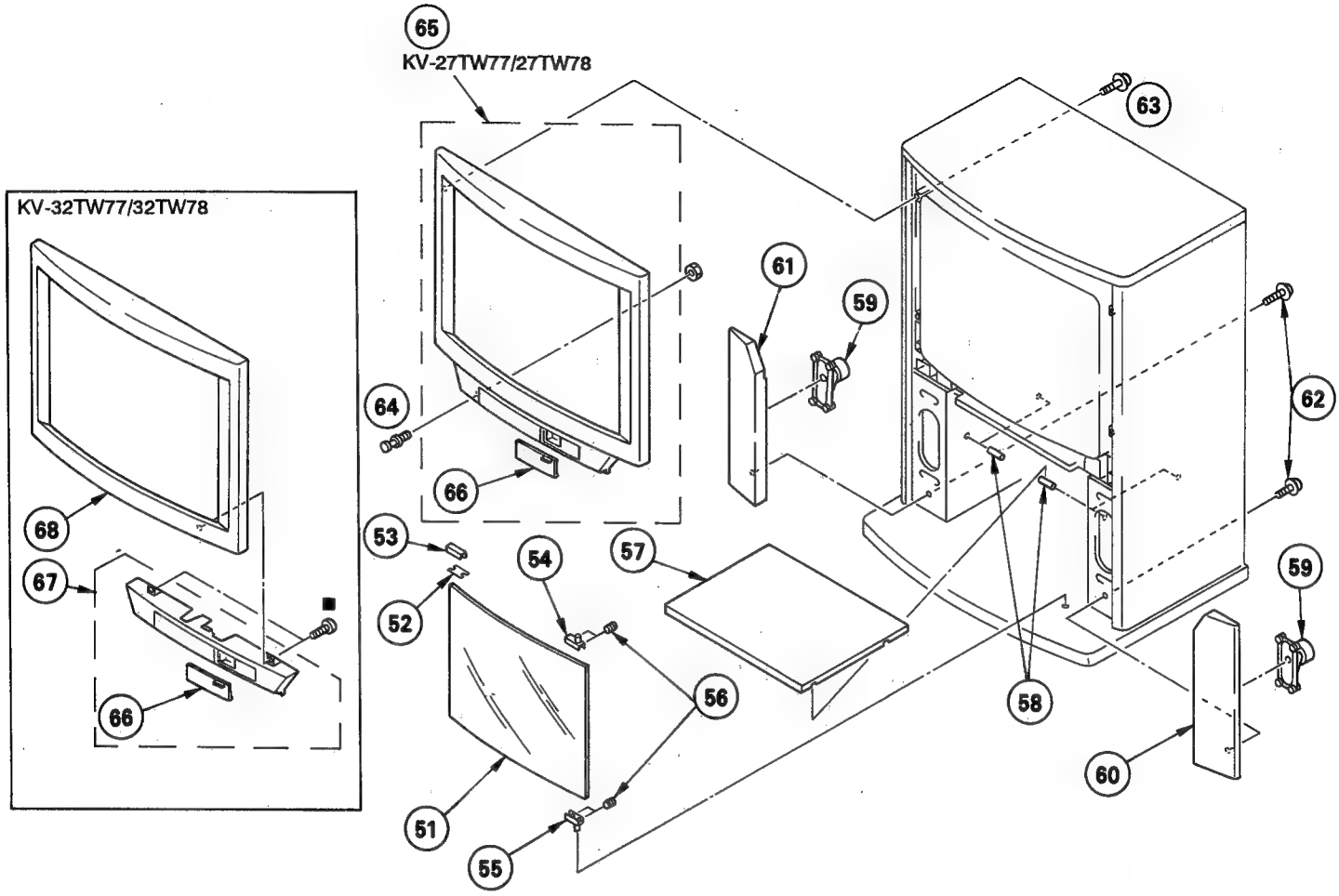
■: BVTP4 × 16 7-685-663-79
△: BVTP4 × 12 7-685-661-14



REF.NO.	PART NO.	DESCRIPTION	REMARK
1	3-704-179-12	EMBLEM (NO.9), SONY	
2	4-040-393-01	FILTER, REMOTE	
3	4-040-394-01	GUIDE, LED	
4	4-040-401-01	BUTTON, MULTI	
5	*1-646-717-11	H BOARD	
6	4-319-520-11	SCREW, SPECIAL (+PW4X30)	
7	*A-1346-112-A	D BOARD, COMPLETE	(KV-32TW77/32TW78)
7	*A-1346-129-A	D BOARD, COMPLETE	(KV-27TW77/27TW78)
8	⚠1-453-146-11	TRANSFORMER ASSY, FLYBACK (NX2604A3)	
9	*A-1297-065-A	A BOARD, COMPLETE	
10	⚠8-598-039-01	TUNER BTF-WA401	
11	*A-1306-427-A	M BOARD, COMPLETE	
12	*A-1341-622-A	E BOARD, COMPLETE	(KV-32TW77/32TW78)
13	*A-1394-415-A	UA BOARD, COMPLETE	
14	*A-1195-062-A	P BOARD, COMPLETE	
15	4-039-524-01	TERMINAL BOARD, ANTENNA	
16	4-039-834-01	LABEL, TERMINAL	
17	4-382-854-11	SCREW (M3X10), P, SW (+)	
18	1-573-657-11	PLUG, F-PIN	
19	⚠1-751-059-11	CORD, POWER (WITH CONNECTOR)	
20	*4-040-402-01	BOARD, REAR	(KV-27TW77/27TW78)
20	4-040-523-01	PLATE, REAR	(KV-32TW77/32TW78)
21	4-378-522-01	SCREW, TAPPING, HEXAGON HEAD	
22	*4-032-338-11	COVER, NECK	

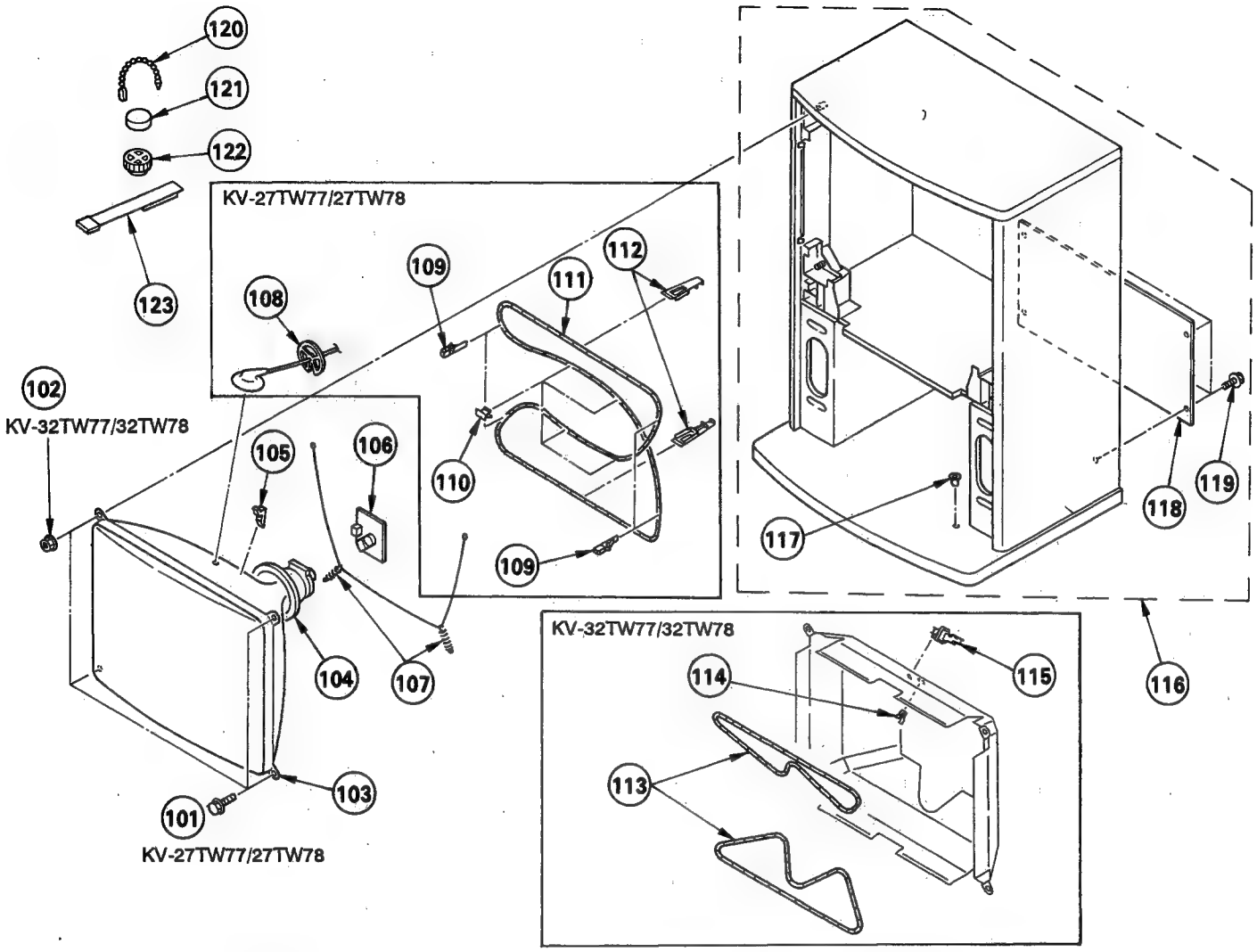
7-2. COVER

■: BVTP4 × 16 7-685-663-79



REF.NO.	PART NO.	DESCRIPTION	REMARK
51	X-4031-136-1	DOOR ASSY, GLASS	(KV-27TW77/27TW78)
51	X-4031-138-1	DOOR ASSY, GLASS	(KV-32TW77/32TW78)
52	2-352-981-01	SPACER	
53	2-359-505-01	RETAINER, MAGNET	
54	4-394-244-01	HINGE (A)	
55	4-394-243-01	HINGE (B)	
56	2-112-355-01	SCREW	
57	X-4031-137-1	PLATE ASSY, RACK	(KV-27TW77/27TW78)
57	X-4031-139-1	PLATE ASSY, RACK	(KV-32TW77/32TW78)
58	4-032-323-01	PIN, RACK	
59	1-544-549-11	SPEAKER	
60	X-4031-132-1	GRILLE ASSY (RIGHT), SPEAKER	(KV-27TW77/27TW78)
60	X-4031-161-1	GRILLE ASSY (RIGHT), SPEAKER	(KV-32TW77/32TW78)
61	X-4031-133-1	GRILLE ASSY (LEFT), SPEAKER	(KV-27TW77/27TW78)
61	X-4031-162-1	GRILLE ASSY (LEFT), SPEAKER	(KV-32TW77/32TW78)
62	4-384-096-01	SCREW (4X16), TAPPING, +P	
63	4-319-520-11	SCREW, SPECIAL (+PW4X30)	
64	4-032-322-02	MAGNET, PUSH	
65	X-4031-134-1	BEZEL ASSY (KV-27TW77/27TW78)	66
66	4-040-047-01	DOOR, CONTROL	
67	X-4031-160-1	PANEL ASSY, CONTROL	66 (KV-32TW77/32TW78)
68	4-032-337-11	BEZEL	(KV-32TW77/32TW78)

7-3. PICTURE TUBE



REF.NO.	PART NO.	DESCRIPTION	REMARK
101	4-390-505-01	SCREW (7), TAPPING	(KV-27TW77/27TW78)
102	4-387-204-01	NUT, SPECIAL, PICTURE TUBE	(KV-32TW77/32TW78)
103	⚠ 8-733-723-05	PICTURE TUBE (A80JYV50X)	(KV-32TW77/32TW78)
103	⚠ 8-733-838-05	PICTURE TUBE (A68KZJ50X)	(KV-27TW77/27TW78)
104	⚠ 1-451-315-41	DEFLECTION YOKE (Y34FYA)	(KV-32TW77/32TW78)
104	⚠ 1-451-275-41	DEFLECTION YOKE (Y28PFA)	(KV-27TW77/27TW78)
105	3-704-495-01	SPACER, DY	
106	*A-1331-264-A	C BOARD, COMPLETE	
107	4-036-329-01	SPRING (B), TENSION	(KV-32TW77/32TW78)
107	4-369-318-00	SPRING (B), TENSION	(KV-27TW77/27TW78)
108	*3-704-312-01	HOLDER, HV CABLE	(KV-27TW77/27TW78)

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION	REMARK
109	4-040-388-01	HOLDER (S), DGC	(KV-27TW77/27TW78)
110	4-040-537-01	HOLDER (A), DGC	(KV-27TW77/27TW78)
111	⚠ T 406 726-11	COIL, DEGAUSSING	(KV-27TW77/27TW78)
112	4-040-387-01	HOLDER (M), DGC	(KV-27TW77/27TW78)
113	⚠ T 402 952-11	COIL, DEMAGNETIZATION	(KV-32TW77/32TW78)
114	*4-371-629-01	STOPPER, WIRE	(KV-32TW77/32TW78)
115	4-033-681-01	HOLDER, LEAD	(KV-32TW77/32TW78)
116	*X-4031-131-1	CABINET ASSY (KV-27TW77)	117-119
116	*X-4031-131-2	CABINET ASSY (KV-27TW78)	117-119
116	*X-4031-163-1	CABINET ASSY (KV-32TW77)	117-119
116	*X-4031-163-2	CABINET ASSY (KV-32TW78)	117-119
117	2-112-350-01	BEARING	
118	4-040-389-01	BOARD, LOWER	
119	4-378-522-01	SCREW, TAPPING, HEXAGON HEAD	
120	4-308-870-00	CLIP, LEAD WIRE	
121	1-452-032-00	MAGNET, DISK; 10MM ϕ	
122	1-452-094-00	MAGNET, ROTATABLE DISK; 15MM ϕ	
123	X-4306-312-0	PERMALLOY ASSY, CONVERGENCE	

P

SECTION 8
ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS
- All resistors are in ohms
- F : nonflammable

When indicating parts by reference number, please include the board name.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

- The components identified by ☒ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF.NO.	PART NO.	DESCRIPTION		REMARK
	*A-1195-062-A	P BOARD, COMPLETE **********		
		<CAPACITOR>		
C3201	1-124-477-11	ELECT 47MF	20% 16V	
C3203	1-164-004-11	CERAMIC CHIP 0.1MF	10% 25V	
C3204	1-124-907-11	ELECT 10MF	20% 50V	
C3205	1-124-907-11	ELECT 10MF	20% 50V	
C3206	1-124-907-11	ELECT 10MF	20% 50V	
C3207	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	
C3208	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	
C3209	1-123-382-00	ELECT 3.3MF	20% 50V	
C3210	1-124-477-11	ELECT 47MF	20% 16V	
C3212	1-123-382-00	ELECT 3.3MF	20% 50V	
C3213	1-164-346-11	CERAMIC CHIP 1MF	16V	
C3214	1-164-346-11	CERAMIC CHIP 1MF	16V	
C3215	1-164-346-11	CERAMIC CHIP 1MF	16V	
C3216	1-164-005-11	CERAMIC CHIP 0.47MF	25V	
C3217	1-164-346-11	CERAMIC CHIP 1MF	16V	
C3218	1-164-346-11	CERAMIC CHIP 1MF	16V	
C3219	1-126-103-11	ELECT 470MF	20% 16V	
C3220	1-164-346-11	CERAMIC CHIP 1MF	16V	
C3221	1-164-346-11	CERAMIC CHIP 1MF	16V	
C3222	1-164-336-11	CERAMIC CHIP 0.33MF	25V	
C3223	1-164-336-11	CERAMIC CHIP 0.33MF	25V	
C3224	1-164-222-11	CERAMIC CHIP 0.22MF	25V	
C3225	1-164-222-11	CERAMIC CHIP 0.22MF	25V	
C3226	1-164-005-11	CERAMIC CHIP 0.47MF	25V	
C3227	1-164-346-11	CERAMIC CHIP 1MF	16V	
C3228	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	
C3229	1-163-093-00	CERAMIC CHIP 10PF	5% 50V	
C3230	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3231	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	
C3232	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	
C3233	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3234	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3235	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3236	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3237	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3238	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	
C3239	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3240	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	
C3241	1-163-103-00	CERAMIC CHIP 27PF	5% 50V	
C3242	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3243	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	
C3244	1-163-113-00	CERAMIC CHIP 68PF	5% 50V	
C3245	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3246	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3247	1-163-033-00	CERAMIC CHIP 0.022MF	50V	
C3248	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	
C3249	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	
C3250	1-163-113-00	CERAMIC CHIP 68PF	5% 50V	
C3251	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3252	1-163-103-00	CERAMIC CHIP 27PF	5% 50V	
C3253	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	
C3254	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3255	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	
C3256	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	
C3257	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	
C3258	1-163-113-00	CERAMIC CHIP 68PF	5% 50V	
C3259	1-163-111-00	CERAMIC CHIP 56PF	5% 50V	
C3260	1-163-119-00	CERAMIC CHIP 120PF	5% 50V	
C3261	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3263	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3264	1-165-319-11	CERAMIC CHIP 0.1MF	50V	
C3265	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3266	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3267	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3268	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3269	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3270	1-165-319-11	CERAMIC CHIP 0.1MF	50V	
C3271	1-165-319-11	CERAMIC CHIP 0.1MF	50V	
C3272	1-165-319-11	CERAMIC CHIP 0.1MF	50V	
C3273	1-163-109-00	CERAMIC CHIP 47PF	5% 50V	
C3274	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	
C3275	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	
C3276	1-163-111-00	CERAMIC CHIP 56PF	5% 50V	
C3277	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	
C3278	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	
C3279	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	
C3280	1-124-907-11	ELECT 10MF	20% 50V	
C3282	1-164-346-11	CERAMIC CHIP 1MF	16V	
		<CONNECTOR>		
CN150	1-573-297-11	CONNECTOR, BOARD TO BOARD 18P		
		<DIODE>		
D3202	8-719-031-68	DIODE HVU359TRF		
D3203	8-719-404-46	DIODE MA110		
D3208	8-719-110-17	DIODE RD10ESB2		
D3209	8-719-110-17	DIODE RD10ESB2		
		<IC>		
IC3200	8-759-971-56	IC MB81461B-12RS-PSZ		
IC3201	8-759-093-29	IC MB86144BPF-G-BND		
IC3202	8-759-093-28	IC MB40176PF-G-BND-EF		
IC3203	8-759-093-28	IC MB40176PF-G-BND-EF		
IC3204	8-759-093-26	IC MB3512PF-EF		

P A

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC3205	8-759-243-19	IC TC7SU04F	
		<COIL>	
L3201	1-410-470-11	INDUCTOR 10UH	
L3202	1-408-424-00	INDUCTOR 180UH	
L3203	1-408-424-00	INDUCTOR 180UH	
L3204	1-410-476-11	INDUCTOR 33UH	
L3205	1-410-470-11	INDUCTOR 10UH	
L3206	1-410-387-11	INDUCTOR 33UH	
L3207	1-410-387-11	INDUCTOR 33UH	
L3208	1-410-387-11	INDUCTOR 33UH	
L3209	1-410-387-11	INDUCTOR 33UH	
		<TRANSISTOR>	
Q3201	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q3202	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q3203	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q3204	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q3206	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q3207	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q3208	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q3209	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q3210	8-729-422-36	TRANSISTOR 2SB709A-Q	
		<RESISTOR>	
R3201	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R3202	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R3203	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R3204	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R3205	1-216-121-00	METAL GLAZE 1M 5% 1/10W	
R3207	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R3208	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R3209	1-216-079-00	METAL GLAZE 18K 5% 1/10W	
R3210	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R3211	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R3212	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R3213	1-216-075-00	METAL GLAZE 12K 5% 1/10W	
R3214	1-216-121-00	METAL GLAZE 1M 5% 1/10W	
R3215	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R3216	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R3217	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R3218	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3219	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3220	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3221	1-216-655-11	METAL CHIP 1.5K 0.50% 1/10W	
R3222	1-216-655-11	METAL CHIP 1.5K 0.50% 1/10W	
R3223	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R3224	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3225	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R3226	1-216-085-00	METAL GLAZE 33K 5% 1/10W	
R3227	1-216-647-11	METAL CHIP 680 0.50% 1/10W	
R3228	1-216-045-00	METAL GLAZE 680 5% 1/10W	
R3229	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R3230	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R3231	1-216-001-00	METAL GLAZE 10 5% 1/10W	
R3232	1-216-083-00	METAL GLAZE 27K 5% 1/10W	
R3233	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3234	1-216-651-11	METAL CHIP 1K 0.50% 1/10W	
R3235	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R3236	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R3237	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R3238	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3239	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R3241	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R3242	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3243	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R3244	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R3245	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R3246	1-216-069-00	METAL GLAZE 6.8K 5% 1/10W	
R3247	1-216-063-00	METAL GLAZE 3.9K 5% 1/10W	
R3248	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R3249	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R3250	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R3251	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3252	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R3253	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R3254	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R3255	1-216-041-00	METAL GLAZE 470 5% 1/10W	
R3256	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R3259	1-216-298-00	METAL GLAZE 2.2 5% 1/10W	
R3260	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R3263	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R3264	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R3265	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3266	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R3267	1-216-055-00	METAL GLAZE 1.8K 5% 1/10W	
R3268	1-216-053-00	METAL GLAZE 1.5K 5% 1/10W	
R3269	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R3270	1-216-657-11	METAL CHIP 1.8K 0.50% 1/10W	
R3271	1-216-655-11	METAL CHIP 1.5K 0.50% 1/10W	
R3273	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R3274	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3275	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3276	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R3277	1-216-298-00	METAL GLAZE 2.2 5% 1/10W	
		<CRYSTAL>	
X3201	1-567-878-11	VIBRATOR, CRYSTAL	
X3202	1-567-878-11	VIBRATOR, CRYSTAL	

****

*A-1297-065-A A BOARD, COMPLETE
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<CAPACITOR>

C173	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C174	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C175	1-126-103-11	ELECT	470MF	20%	16V
C176	1-126-103-11	ELECT	470MF	20%	16V
C177	1-124-907-11	ELECT	10MF	20%	50V
C178	1-126-101-11	ELECT	100MF	20%	16V
C179	1-124-916-11	ELECT	22MF	20%	25V
C181	1-164-161-11	CERAMIC CHIP	0.0022MF	10%	50V

<CONNECTOR>

CN103	*1-564-519-11	PLUG, CONNECTOR 4P
CN151	*1-573-979-11	CONNECTOR, BOARD TO BOARD 11P
CN152	1-750-394-11	PIN, CONNECTOR (STAKING) 32P
CN164	*1-564-505-11	PLUG, CONNECTOR 2P
CN165	*1-564-505-11	PLUG, CONNECTOR 2P

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

A **M**

REF.NO.	PART NO.	DESCRIPTION				REMARK
		<DIODE>				
D170	8-719-110-76	DIODE RD33ESB1				
		<COIL>				
L170	1-408-408-00	INDUCTOR	8.2UH			
L171	1-408-408-00	INDUCTOR	8.2UH			
L172	1-408-408-00	INDUCTOR	8.2UH			
		<RESISTOR>				
R170	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R174	1-216-689-11	METAL GLAZE	39K	5%	1/10W	
R176	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R177	1-215-900-11	METAL OXIDE	22K	5%	2W	F
R179	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R187	1-216-083-00	METAL GLAZE	27K	5%	1/10W	
R193	1-216-037-00	METAL GLAZE	330	5%	1/10W	
		<TUNER>				
TU101 ⚠	8-598-039-01	TUNER BTF WA40				
		**********				
	*A-1306-427-A	M BOARD, COMPLETE				
		**********				
		<CAPACITOR>				
C002	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V	
C003	1-163-001-11	CERAMIC CHIP	220PF	10%	50V	
C005	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C006	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C007	1-124-903-11	ELECT	1MF	20%	50V	
C008	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C009	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C010	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C012	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C013	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C014	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C015	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C016	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C017	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C018	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C019	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C021	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C022	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C023	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C025	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C028	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C029	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C041	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V	
C043	1-163-159-00	CERAMIC CHIP	12PF	2%	50V	
C045	1-124-119-00	ELECT	330MF	20%	16V	
C047	1-104-896-91	CERAMIC CHIP	24PF	2%	50V	
C049	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C050	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C051	1-163-031-11	CERAMIC CHIP	0.01MF		50V	
C052	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C053	1-163-121-00	CERAMIC CHIP	150PF	5%	50V	
C054	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C055	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C056	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C057	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V	
C058	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V	
C059	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C060	1-124-903-11	ELECT	1MF	20%	50V	
C061	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	
C062	1-124-907-11	ELECT	10MF	20%	50V	
C150	1-136-165-00	FILM	0.1MF	5%	50V	
C151	1-136-175-00	FILM	0.068MF	5%	50V	
C152	1-124-907-11	ELECT	10MF	20%	50V	
C153	1-137-367-11	FILM	0.0033MF	5%	50V	
C154	1-163-038-00	CERAMIC CHIP	0.1MF		25V	
C155	1-124-907-11	ELECT	10MF	20%	50V	
C156	1-163-135-00	CERAMIC CHIP	560PF	5%	50V	
C157	1-163-038-00	CERAMIC CHIP	0.1MF		25V	
C158	1-124-903-11	ELECT	1MF	20%	50V	
C160	1-124-903-11	ELECT	1MF	20%	50V	
C201	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V	
C202	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C203	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V	
C204	1-126-101-11	ELECT	100MF	20%	16V	
C205	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C211	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V	
C212	1-124-902-00	ELECT	0.47MF	20%	50V	
C213	1-124-902-00	ELECT	0.47MF	20%	50V	
C214	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V	
C216	1-124-478-11	ELECT	100MF	20%	25V	
C301	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	
C305	1-124-907-11	ELECT	10MF	20%	50V	
C306	1-124-902-00	ELECT	0.47MF	20%	50V	
C307	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C308	1-163-099-00	CERAMIC CHIP	18PF	5%	50V	
C310	1-124-916-11	ELECT	22MF	20%	25V	
C311	1-124-903-11	ELECT	1MF	20%	50V	
C313	1-163-003-11	CERAMIC CHIP	330PF	10%	50V	
C315	1-124-907-11	ELECT	10MF	20%	50V	
C316	1-124-907-11	ELECT	10MF	20%	50V	
C317	1-124-907-11	ELECT	10MF	20%	50V	
C318	1-136-165-00	FILM	0.1MF	5%	50V	
C319	1-136-165-00	FILM	0.1MF	5%	50V	
C320	1-136-165-00	FILM	0.1MF	5%	50V	
C321	1-124-360-00	ELECT	1000MF	20%	16V	
C322	1-136-153-00	FILM	0.01MF	5%	50V	
C323	1-126-176-11	ELECT	220MF	20%	10V	
C324	1-163-003-11	CERAMIC CHIP	330PF	10%	50V	
C325	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V	
C326	1-136-169-00	FILM	0.22MF	5%	50V	
C327	1-136-169-00	FILM	0.22MF	5%	50V	
C328	1-124-902-00	ELECT	0.47MF	20%	50V	
C329	1-124-903-11	ELECT	1MF	20%	50V	
C330	1-124-907-11	ELECT	10MF	20%	50V	
C331	1-124-907-11	ELECT	10MF	20%	50V	
C332	1-164-489-11	CERAMIC CHIP	0.22MF	10%	16V	
C333	1-163-011-11	CERAMIC CHIP	0.0015MF	10%	50V	
C334	1-124-902-00	ELECT	0.47MF	20%	50V	
C335	1-163-001-11	CERAMIC CHIP	220PF	10%	50V	
C336	1-124-903-11	ELECT	1MF	20%	50V	
C337	1-124-902-00	ELECT	0.47MF	20%	50V	
C338	1-136-153-00	FILM	0.01MF	5%	50V	
C340	1-124-903-11	ELECT	1MF	20%	50V	
C341	1-163-005-11	CERAMIC CHIP	470PF	10%	50V	
C342	1-137-414-91	FILM	0.0047MF	10%	100V	
		<CONNECTOR>				

REF.NO.	PART NO.	DESCRIPTION	REMARK
CN129	*1-564-523-11	PLUG, CONNECTOR 8P	
CN130	1-573-301-11	CONNECTOR, BOARD TO BOARD 20P	
CN131	*1-691-632-11	CONNECTOR, BOARD TO BOARD 15P	
CN137	1-750-394-11	PIN, CONNECTOR (STAKING) 32P	
CN138	*1-564-511-31	PLUG, CONNECTOR 8P	
CN168	*1-564-505-11	PLUG, CONNECTOR 2P	
		<DIODE>	
D001	8-719-404-46	DIODE MA110	
D002	8-719-404-46	DIODE MA110	
D004	8-719-404-46	DIODE MA110	
D005	8-713-300-57	DIODE 1T33	
D006	8-719-110-17	DIODE RD10ESB2	
D007	8-719-110-17	DIODE RD10ESB2	
D008	8-719-110-17	DIODE RD10ESB2	
D009	8-719-110-17	DIODE RD10ESB2	
D150	8-719-404-46	DIODE MA110	
D201	8-719-404-46	DIODE MA110	
D202	8-719-404-46	DIODE MA110	
D205	8-719-110-17	DIODE RD10ESB2	
D206	8-719-110-17	DIODE RD10ESB2	
D301	8-719-110-17	DIODE RD10ESB2	
D304	8-719-110-17	DIODE RD10ESB2	
D305	8-719-404-46	DIODE RD10ESB2	
D306	8-719-404-46	DIODE RD10ESB2	
		<IC>	
IC101	8-752-841-16	IC CXP80424-065S	
IC102	8-759-043-86	IC ST24C02AB1	
IC150	8-759-084-09	IC Z8612812PSC	
IC201	8-759-090-21	IC TDA8424	
IC202	8-759-983-69	IC LM358PS	
IC301	8-752-059-67	IC CXA1465AS	
		<JUMPER RESISTOR>	
JR200	1-216-295-00	METAL GLAZE 0 5% 1/10W	
		<COIL>	
L001	1-410-470-11	INDUCTOR 10UH	
L002	1-408-414-00	INDUCTOR 27UH	
L150	1-410-470-11	INDUCTOR 10UH	
		<TRANSISTOR>	
Q001	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q002	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q004	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q005	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q151	8-729-422-36	TRANSISTOR 2SD601A-Q	
Q201	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q301	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q302	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q307	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q308	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q314	8-729-422-27	TRANSISTOR 2SD601A-Q	
		<RESISTOR>	
R002	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R003	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R004	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R005	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R006	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R007	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R008	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R009	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R011	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R012	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R013	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R016	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R017	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R018	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R019	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R020	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R021	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R022	1-216 073-00	METAL GLAZE 10K 5% 1/10W	
R023	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R025	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R026	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R027	1-216-121-00	METAL GLAZE 1M 5% 1/10W	
R028	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R029	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R030	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R031	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R032	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R033	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R034	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R035	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R036	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R037	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R038	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R039	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R040	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R041	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R042	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R043	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R044	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R045	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R046	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R047	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R048	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R049	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R050	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R051	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R052	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R053	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R054	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R058	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R059	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R061	1-216-077-00	METAL GLAZE 15K 5% 1/10W	
R062	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R064	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R065	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R066	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R067	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R074	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R075	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R076	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R078	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R079	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R080	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R082	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R083	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R086	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R087	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R089	1-216-083-00	METAL GLAZE 27K 5% 1/10W	
R090	1-216-073-00	METAL GLAZE 10K 5% 1/10W	

M **C**

REF.NO.	PART NO.	DESCRIPTION				REMARK
R091	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R092	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R093	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R150	1-216-097-00	METAL GLAZE	100K	5%	1/10W	
R151	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R152	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R153	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W	
R154	1-216-041-00	METAL GLAZE	470	5%	1/10W	
R155	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R156	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R157	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R158	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R159	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R160	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R161	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R162	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R163	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R164	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R165	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R201	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R202	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R203	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R204	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R205	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R206	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R207	1-216-085-00	METAL GLAZE	33K	5%	1/10W	
R208	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R209	1-216-085-00	METAL GLAZE	33K	5%	1/10W	
R210	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R211	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R212	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R213	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R218	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R219	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R220	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R222	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R223	1-216-045-00	METAL GLAZE	680	5%	1/10W	
R301	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R302	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R303	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R306	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R312	1-216-119-00	METAL GLAZE	820K	5%	1/10W	
R313	1-216-079-00	METAL GLAZE	18K	5%	1/10W	
R321	1-216-041-00	METAL GLAZE	470	5%	1/10W	
R323	1-216-041-00	METAL GLAZE	470	5%	1/10W	
R324	1-216-041-00	METAL GLAZE	470	5%	1/10W	
R327	1-216-653-11	METAL CHIP	1.2K	0.50%	1/10W	
R328	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R329	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R330	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R331	1-216-678-11	METAL CHIP	13K	0.50%	1/10W	
R332	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R333	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R334	1-216-687-11	METAL CHIP	33K	0.50%	1/10W	
R335	1-216-121-00	METAL GLAZE	1M	5%	1/10W	
R336	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R337	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R338	1-249-417-11	CARBON	1K	5%	1/4W	F
R339	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R340	1-216-077-00	METAL GLAZE	15K	5%	1/10W	
R341	1-216-085-00	METAL GLAZE	33K	5%	1/10W	
R342	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R343	1-216-053-00	METAL GLAZE	1.5K	5%	1/10W	
R344	1-216-043-00	METAL GLAZE	560	5%	1/10W	
R345	1-216-109-00	METAL GLAZE	330K	5%	1/10W	
R346	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W	
R347	1-249-409-91	CARBON	220	5%	1/4W	F
R348	1-216-097-00	METAL GLAZE	100K	5%	1/10W	
R349	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R350	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R351	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R352	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R353	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R354	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R356	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R374	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R375	1-216-033-00	METAL GLAZE	220	5%	1/10W	

<CRYSTAL>

X001	1-579-917-21	VIBRATOR, CRYSTAL	
X301	1-567-505-11	OSCILLATOR, CRYSTAL	

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*A-1331-264-A C BOARD, COMPLETE
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<CAPACITOR>

C700	1-102-074-00	CERAMIC	0.001MF	10%	50V
C701	1-162-114-00	CERAMIC	0.0047MF		2KV
C702	1-106-375-12	MYLAR	0.022MF	99%	200V
C703	1-106-375-12	MYLAR	0.022MF	99%	200V
C704	1-162-116-00	CERAMIC	680PF	10%	2KV
C705	1-123-946-00	ELECT	4.7MF	20%	250V
C706	1-126-101-11	ELECT	100MF	20%	16V
C707	1-102-129-00	CERAMIC	0.01MF	10%	50V
C711	1-164-083-11	CERAMIC	680PF	10%	50V
C712	1-164-081-11	CERAMIC	470PF	10%	50V
C731	1-164-083-11	CERAMIC	680PF	10%	50V
C732	1-164-081-11	CERAMIC	470PF	10%	50V
C751	1-164-083-11	CERAMIC	680PF	10%	50V
C752	1-164-083-11	CERAMIC	680PF	10%	50V

<CONNECTOR>

CN701	1-695-915-11	TAB (CONTACT)
CN702	*1-508-768-00	PIN, CONNECTOR (5MM PITCH) 6P
CN703	*1-564-511-11	PLUG, CONNECTOR 8P

<DIODE>

D711	8-719-911-19	DIODE 1SS119
D712	8-719-911-19	DIODE 1SS119
D731	8-719-911-19	DIODE 1SS119
D732	8-719-911-19	DIODE 1SS119
D751	8-719-911-19	DIODE 1SS119
D752	8-719-911-19	DIODE 1SS119
D770	8-719-911-19	DIODE 1SS119
D771	8-719-911-19	DIODE 1SS119
D772	8-719-911-19	DIODE 1SS119
D773	8-719-911-19	DIODE 1SS119
D777	8-719-109-68	DIODE RD3.6ESB1
D790	8-719-911-19	DIODE 1SS119
D791	8-719-911-19	DIODE 1SS119
D792	8-719-911-19	DIODE 1SS119
D793	8-719-911-19	DIODE 1SS119

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

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REF.NO.	PART NO.	DESCRIPTION				REMARK
D794	8-719-911-19	DIODE 1SS119				
D795	8-719-911-19	DIODE 1SS119				
		<SOCKET>				
J701 ⚠	1-540-071-13	SOCKET, PICTURE TUBE				
		<COIL>				
L701	1-410-478-11	INDUCTOR	47UH			
		<TRANSISTOR>				
Q711	8-729-926-73	TRANSISTOR 2SC3271F-N				
Q712	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q731	8-729-926-73	TRANSISTOR 2SC3271F-N				
Q732	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q751	8-729-926-73	TRANSISTOR 2SC3271F-N				
Q752	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q770	8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q771	8-729-200-17	TRANSISTOR 2SA1091-O				
Q772	8-729-200-17	TRANSISTOR 2SA1091-O				
Q773	8-729-200-17	TRANSISTOR 2SA1091-O				
Q790	8-729-119-78	TRANSISTOR 2SC2785-HFE				
		<RESISTOR>				
R700	1-247-739-11	CARBON	100	5%	1/2W	
R701	1-244-941-00	CARBON	680K	5%	1/2W	
R702	1-249-496-11	CARBON	100K	5%	1/2W	
R703	1-249-496-11	CARBON	100K	5%	1/2W	
R704	1-216-398-11	METAL OXIDE	5.6	5%	3W	F
R705	1-216-398-11	METAL OXIDE	5.6	5%	3W	F
R706	1-214-921-00	CARBON	220K	5%	1/2W	
R710	1-247-758-11	CARBON	3.3K	5%	1/2W	
R711	1-249-405-11	CARBON	100	5%	1/4W	
R712	1-215-924-00	METAL OXIDE	15K	5%	3W	F
R714	1-249-425-11	CARBON	4.7K	5%	1/4W	
R716	1-249-417-11	CARBON	1K	5%	1/4W	
R717	1-249-393-11	CARBON	10	5%	1/4W	
R718	1-249-413-11	CARBON	470	5%	1/4W	
R730	1-247-758-11	CARBON	3.3K	5%	1/2W	
R731	1-249-405-11	CARBON	100	5%	1/4W	
R732	1-215-924-00	METAL OXIDE	15K	5%	3W	F
R734	1-249-425-11	CARBON	4.7K	5%	1/4W	
R736	1-249-411-11	CARBON	330	5%	1/4W	
R737	1-249-393-11	CARBON	10	5%	1/4W	
R750	1-247-758-11	CARBON	3.3K	5%	1/2W	
R751	1-249-405-11	CARBON	100	5%	1/4W	
R752	1-215-924-00	METAL OXIDE	15K	5%	3W	F
R754	1-249-425-11	CARBON	4.7K	5%	1/4W	
R756	1-249-411-11	CARBON	330	5%	1/4W	
R757	1-249-393-11	CARBON	10	5%	1/4W	
R770	1-249-433-11	CARBON	22K	5%	1/4W	
R771	1-249-409-91	CARBON	220	5%	1/4W	F
R772	1-249-409-91	CARBON	220	5%	1/4W	F
R773	1-249-409-91	CARBON	220	5%	1/4W	F
R774	1-249-437-11	CARBON	47K	5%	1/4W	
R775	1-249-417-11	CARBON	1K	5%	1/4W	F
R776	1-249-409-91	CARBON	220	5%	1/4W	F
R790	1-249-413-11	CARBON	470	5%	1/4W	
R791	1-249-412-11	CARBON	390	5%	1/4W	
R792	1-249-424-11	CARBON	3.9K	5%	1/4W	
R794	1-249-424-11	CARBON	3.9K	5%	1/4W	
R796	1-249-424-11	CARBON	3.9K	5%	1/4W	
R798	1-249-437-11	CARBON	47K	5%	1/4W	
R799	1-249-437-11	CARBON	47K	5%	1/4W	
		<VARIABLE RESISTOR>				
RV701 ⚠	1-241-656-21	RES, ADJ, METAL FILM 110M				
RV702	1-230-641-11	RES, ADJ, METAL GLAZE 2.2M				
**********						
	*A-1341-622-A	E BOARD, COMPLETE (KV-32TW77/32TW78)				
		**********				
	*1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P				
		<CAPACITOR>				
C1501	1-126-103-11	ELECT	470MF	20%	16V	
C1502	1-137-372-11	FILM	0.022MF	5%	50V	
C1503	1-102-234-00	CERAMIC	270PF	10%	500V	
C1504	1-136-165-00	FILM	0.1MF	5%	50V	
C1505	1-124-907-11	ELECT	10MF	20%	50V	
C1507	1-124-907-11	ELECT	10MF	20%	50V	
C1509	1-136-165-00	FILM	0.1MF	5%	50V	
C1510	1-137-370-11	FILM	0.01MF	5%	50V	
C1516	1-136-165-00	FILM	0.1MF	5%	50V	
C1519	1-136-104-00	FILM	0.16MF	5%	200V	
C1522	1-124-360-00	ELECT	1000MF	20%	16V	
C1523	1-136-177-00	FILM	1MF	5%	50V	
C1524	1-124-927-11	ELECT	4.7MF	20%	50V	
C1529	1-124-907-11	ELECT	10MF	20%	50V	
C1530	1-124-907-11	ELECT	10MF	20%	50V	
C1532	1-124-477-11	ELECT	47MF	20%	16V	
C1533	1-124-916-11	ELECT	22MF	20%	25V	
C1542	1-124-477-11	ELECT	47MF	20%	16V	
C1550	1-136-756-11	FILM	0.24MF	5%	200V	
		<CONNECTOR>				
CN122	*1-573-299-11	CONNECTOR, BOARD TO BOARD 10P				
CN123	*1-573-299-11	CONNECTOR, BOARD TO BOARD 10P				
		<DIODE>				
D1501	8-719-911-19	DIODE 1SS119				
D1502	8-719-801-35	THYRISTOR SHOR3D42				
D1503	8-719-980-78	DIODE ERA83-006				
D1504	8-719-936-84	DIODE RGP10GPKG3				
D1505	8-719-911-19	DIODE 1SS119				
D1506	8-719-911-19	DIODE 1SS119				
D1507	8-719-911-19	DIODE 1SS119				
D1508	8-719-110-17	DIODE RD10ESB2				
D1509	8-719-110-17	DIODE RD10ESB2				
D1510	8-719-911-19	DIODE 1SS119				
D1513	8-719-936-84	DIODE RGP10GPKG3				
D1515	8-719-911-19	DIODE 1SS119				
D1516	8-719-987-87	DIODE ERA85-009				
D1517	8-719-911-19	DIODE 1SS119				
		<IC>				
IC1501	8-752-052-88	IC CXA1526P				
IC1502	8-759-982-10	IC RC7809FA				
IC1504	8-759-135-80	IC UPC358C				

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The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION				REMARK
		<COIL>				
L1502	1-459-592-11	COIL (WITH CORE) (PMC)				
L1504	1-459-474-11	COIL (WITH CORE)				
		<TRANSISTOR>				
Q1501	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q1502	8-729-140-96	TRANSISTOR 2SD774-34				
Q1503	8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q1506	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q1507	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q1508	8-729-140-97	TRANSISTOR 2SB734-34				
Q1509	8-729-140-97	TRANSISTOR 2SB734-34				
Q1511	8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q1514	8-729-209-15	TRANSISTOR 2SD2012				
Q1519	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q1520	8-729-119-78	TRANSISTOR 2SC2785-HFE				
		<RESISTOR>				
R1501	1-249-409-11	CARBON	220	5%	1/4W	
R1502	1-249-409-11	CARBON	220	5%	1/4W	
R1503	1-249-435-11	CARBON	33K	5%	1/4W	
R1504	1-249-429-11	CARBON	10K	5%	1/4W	
R1505	1-249-421-11	CARBON	2.2K	5%	1/4W	
R1506	1-249-423-11	CARBON	3.3K	5%	1/4W	
R1507	1-249-410-11	CARBON	270	5%	1/4W	
R1508	1-249-437-11	CARBON	47K	5%	1/4W	
R1509	1-249-429-11	CARBON	10K	5%	1/4W	
R1510	1-215-461-00	METAL	47K	1%	1/4W	
R1511	1-216-379-11	METAL OXIDE	6.8	5%	2W	F
R1513	1-249-423-11	CARBON	3.3K	5%	1/4W	
R1514	1-247-885-00	CARBON	180K	5%	1/4W	
R1515	1-215-905-11	METAL OXIDE	10	5%	3W	F
R1519	1-249-417-11	CARBON	1K	5%	1/4W	
R1520	1-249-417-11	CARBON	1K	5%	1/4W	
R1522	1-249-417-11	CARBON	1K	5%	1/4W	
R1527	1-249-417-11	CARBON	1K	5%	1/4W	F
R1528	1-249-438-11	CARBON	56K	5%	1/4W	
R1529	1-249-434-11	CARBON	27K	5%	1/4W	
R1530	1-249-432-11	CARBON	18K	5%	1/4W	
R1533	1-249-427-11	CARBON	6.8K	5%	1/4W	
R1534	1-249-424-11	CARBON	3.9K	5%	1/4W	
R1535	1-249-425-11	CARBON	4.7K	5%	1/4W	
R1536	1-215-857-11	METAL OXIDE	10	5%	1W	F
R1537	1-249-404-00	CARBON	82	5%	1/4W	
R1538	1-216-379-11	METAL OXIDE	6.8	5%	2W	F
R1541	1-249-441-11	CARBON	100K	5%	1/4W	
R1543	1-249-414-11	CARBON	560	5%	1/4W	
R1546	1-215-885-00	METAL OXIDE	68	5%	2W	F
R1552	1-249-426-11	CARBON	5.6K	5%	1/4W	
R1554	1-249-393-11	CARBON	10	5%	1/4W	
R1556	1-249-438-11	CARBON	56K	5%	1/4W	
R1559	1-249-429-11	CARBON	10K	5%	1/4W	
R1564	1-249-435-11	CARBON	33K	5%	1/4W	
R1568	1-247-891-00	CARBON	330K	5%	1/4W	
R1569	1-249-413-11	CARBON	470	5%	1/4W	
R1578	1-249-423-11	CARBON	3.3K	5%	1/4W	
R1582	1-249-411-11	CARBON	330	5%	1/4W	
R1583	1-249-421-11	CARBON	2.2K	5%	1/4W	
R1585	1-249-441-11	CARBON	100K	5%	1/4W	
R1586	1-247-891-00	CARBON	330K	5%	1/4W	

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*A-1346-112-A	D BOARD, COMPLETE (KV-32TW77/32TW78)		
	**********		
*A-1346-129-A	D BOARD, COMPLETE (KV-27TW77/27TW78)		
	**********		
1-533-223-11	CLIP, FUSE		
4-382-854-11	SCREW (M3X10), P, SW (+)		

<CAPACITOR>

C501	1-124-557-11	ELECT	1000MF	20%	25V
C502	1-162-131-11	CERAMIC	220PF	10%	2KV
C503	1-124-557-11	ELECT	1000MF	20%	25V
C504	1-137-366-11	FILM	0.0022MF	5%	50V
C505	1-124-916-11	ELECT	22MF	20%	25V
C506	1-124-929-11	ELECT	22MF	20%	100V
C507	1-124-046-00	ELECT	10MF	20%	160V
C508	1-129-898-00	FILM	0.0022MF	5%	630V (KV-27TW77/27TW78)
C509	1-124-916-11	ELECT	22MF	20%	25V
C511	1-123-024-21	ELECT	33MF		160V
C512	1-102-212-00	CERAMIC	820PF	10%	500V
C513	1-102-212-00	CERAMIC	820PF	10%	500V
C514	1-102-244-00	CERAMIC	220PF	10%	500V
C515	1-137-416-11	FILM	0.01MF	10%	100V
C517	1-162-116-00	CERAMIC	680PF	10%	2KV
C518	1-162-116-00	CERAMIC	680PF	10%	2KV
C519 ⚠	1-137-024-11	FILM	0.02MF	5%	2KV
C520 ⚠	1-162-134-11	CERAMIC	470PF	10%	2KV
C521 ⚠	1-136-316-51	FILM	0.056MF	5%	630V
C522	1-106-383-00	MYLAR	0.047MF	99%	200V
C523	1-102-002-00	CERAMIC	680PF	10%	500V
C524	1-102-212-00	CERAMIC	820PF	10%	500V
C525	1-124-902-00	ELECT	0.47MF	20%	50V
C526	1-106-395-00	MYLAR	0.15MF	10%	200V
C527	1-124-341-00	ELECT	1MF	20%	200V
C528	1-136-113-00	FILM	2MF	5%	200V
C529	1-137-410-11	FILM	0.001MF	10%	100V
C530	1-104-770-11	FILM	0.62MF	5%	200V
C530	1-104-844-11	CAP, FILM (S)	0.62MF		
C531	1-124-477-11	ELECT	47MF	20%	25V
C532	1-136-165-00	FILM	0.1MF	5%	50V
C533	1-124-927-11	ELECT	4.7MF	20%	50V
C534	1-136-161-00	FILM	0.047MF	5%	50V
C535	1-124-911-11	ELECT	220MF	20%	50V
C536	1-137-421-91	FILM	0.068MF	10%	100V
C538	1-136-161-00	FILM	0.047MF	5%	50V
C540	1-137-366-11	FILM	0.0022MF	5%	50V
C541	1-137-366-11	FILM	0.0022MF	5%	50V
C542	1-130-481-00	FILM	0.0068MF	5%	50V
C545	1-124-927-11	ELECT	4.7MF	20%	50V
C547	1-164-079-11	CERAMIC	330PF	10%	50V
C548 ⚠	1-162-116-91	CERAMIC	680PF	10%	2KV
C550	1-106-387-00	MYLAR	0.068MF	10%	200V
C553	1-164-079-11	CERAMIC	330PF	10%	50V
C561	1-162-815-11	CERAMIC	47PF	5%	500V
C595	1-123-932-00	ELECT	4.7MF	20%	160V
C598	1-124-342-00	ELECT	3.3MF	20%	160V
C600	1-124-907-11	ELECT	10MF	20%	50V
C601 ⚠	1-136-311-51	FILM	0.47MF	20%	125V

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

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REF.NO.	PART NO.	DESCRIPTION			REMARK
C602 ⚠	1-136-311-51	FILM	0.47MF	20%	125V
C603 ⚠	1-136-311-51	FILM	0.47MF	20%	125V
C604 ⚠	1-162-578-81	CERAMIC	0.0047MF	20%	400V
C607	1-104-757-11	ELECT	470MF	20%	200V
C608	1-104-757-11	ELECT	470MF	20%	200V
C609	1-136-169-00	FILM	0.22MF	5%	50V
C610	1-136-169-00	FILM	0.22MF	5%	50V
C611	1-136-169-00	FILM	0.22MF	5%	50V
C612	1-136-169-00	FILM	0.22MF	5%	50V
C613	1-164-625-11	CERAMIC	680PF	10%	500V
C614	1-164-625-11	CERAMIC	680PF	10%	500V
C616	1-124-907-11	ELECT	10MF	20%	50V
C617	1-124-618-11	ELECT	2200MF	20%	35V
C618	1-124-557-11	ELECT	1000MF	20%	25V
C619	1-124-360-00	ELECT	1000MF	20%	16V
C620	1-164-644-11	CERAMIC	330PF	10%	500V
C621	1-126-356-11	ELECT	220MF	20%	160V
C623	1-162-117-00	CERAMIC	100PF	10%	500V
C624	1-136-487-81	FILM	0.015MF	5%	50V
C625	1-129-744-91	FILM	0.027MF	10%	400V
C626	1-124-478-11	ELECT	100MF	20%	25V
C627	1-124-443-00	ELECT	100MF	20%	10V
C628 ⚠	1-164-497-51	CERAMIC	470PF	20%	400V
C634	1-165-127-11	CERAMIC	470PF	10%	500V
C635	1-124-477-11	ELECT	47MF	20%	16V
C636	1-137-374-11	FILM	0.047MF	5%	50V
C637	1-124-916-11	ELECT	22MF	20%	25V
C640	1-124-902-00	ELECT	0.47MF	20%	50V
C641	1-124-443-00	ELECT	100MF	20%	10V
C642	1-137-217-11	FILM	0.01MF	5%	1.25KV
C643	1-137-218-11	FILM	0.012MF	5%	1.25KV
C645	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C646	1-126-101-11	ELECT	100MF	20%	16V
C647	1-124-916-11	ELECT	22MF	20%	25V
C684	1-124-907-11	ELECT	10MF	20%	50V
C695	1-124-907-11	ELECT	10MF	20%	50V
C2205	1-124-925-11	ELECT	2.2MF	20%	50V
C2208	1-124-925-11	ELECT	2.2MF	20%	50V
C2210	1-124-120-11	ELECT	220MF	20%	25V
C2211	1-124-477-11	ELECT	47MF	20%	25V
C2212	1-124-120-11	ELECT	220MF	20%	25V
C2213	1-136-173-00	FILM	0.47MF	5%	50V
C2215	1-136-169-00	FILM	0.22MF	5%	50V
C2216	1-124-480-11	ELECT	470MF	20%	25V
C2217	1-136-169-00	FILM	0.22MF	5%	50V
C2218	1-124-557-11	ELECT	1000MF	20%	25V
C2219	1-124-557-11	ELECT	1000MF	20%	25V
C2220	1-124-925-11	ELECT	2.2MF	20%	50V

<CONNECTOR>

CN104	*1-573-979-11	CONNECTOR, BOARD TO BOARD 11P	
CN105	*1-508-768-00	PIN, CONNECTOR (5MM PITCH) 6P	
CN107	*1-580-798-11	CONNECTOR PIN (DY) 6P	
CN108	1-573-296-11	CONNECTOR, BOARD TO BOARD 10P	(KV-32TW77/32TW78)
CN109	1-573-296-11	CONNECTOR, BOARD TO BOARD 10P	(KV-32TW77/32TW78)
CN113	*1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P	
CN114	*1-580-843-11	PIN, CONNECTOR (POWER)	
CN115	1-573-298-11	CONNECTOR, BOARD TO BOARD 20P	
CN116	*1-691-616-11	CONNECTOR, BOARD TO BOARD 15P	
CN117	*1-573-978-11	CONNECTOR, BOARD TO BOARD 11P	

REF.NO.	PART NO.	DESCRIPTION	REMARK

<DIODE>

D501	8-719-028-72	DIODE RGP02-17EL-6433	
D502	8-719-979-85	DIODE EGP20G	
D503	8-719-979-85	DIODE EGP20G	
D504 ⚠	8-719-302-44	DIODE EL1Z-V1	
D505	8-719-936-84	DIODE RGP10GPKG3	
D506	8-719-945-80	DIODE ERC06-15S	
D507	8-719-945-80	DIODE ERC06-15S	
D508	8-719-900-26	DIODE ERD29-08J	
D509	8-719-936-84	DIODE RGP10GPKG3	
D510	8-719-936-82	DIODE GP08DPKG3	
D511	8-719-936-82	DIODE GP08DPKG3	
D512	8-719-109-84	DIODE RD5.1ESB1	
D513	8-719-936-82	DIODE GP08DPKG3	
D514	8-719-911-19	DIODE 1SS119	
D515	8-719-911-19	DIODE 1SS119	
D601	8-719-911-19	DIODE 1SS119	
D602 ⚠	8-719-510-69	DIODE D4SB60L-F	
D603	8-719-500-69	DIODE S3V10SS	
D605	8-719-500-69	DIODE S3V10SS	
D607	8-719-510-02	DIODE D1NS4	
D608	8-719-510-02	DIODE D1NS4	
D609	8-719-510-02	DIODE D1NS4	
D610	8-719-510-02	DIODE D1NS4	
D611	8-719-510-02	DIODE D1NS4	
D612	8-719-031-80	DIODE D5SC4MR	
D613	8-719-022-97	DIODE D2S4MF	
D614	8-719-110-33	DIODE RD12ESB3	
D615	8-719-027-43	DIODE S2L20UF	
D616	8-719-027-43	DIODE S2L20UF	
D617	8-719-027-43	DIODE S2L20UF	
D618	8-719-027-43	DIODE S2L20UF	
D619	8-719-510-02	DIODE D1NS4	
D622	8-719-911-19	DIODE 1SS119	
D623	8-719-911-19	DIODE 1SS119	
D624	8-719-911-19	DIODE 1SS119	
D626	8-719-510-48	DIODE D1N20R	
D627	8-719-510-48	DIODE D1N20R	
D628	8-719-911-19	DIODE 1SS119	
D633	8-719-110-09	DIODE RD8.2ESB3	
D634	8-719-911-19	DIODE 1SS119	
D635	8-719-911-19	DIODE 1SS119	
D636	8-719-510-48	DIODE D1N20R	
D637	8-719-911-19	DIODE 1SS119	
D638	8-719-911-19	DIODE 1SS119	

<FUSE>

F601 ⚠	1-532-778-11	FUSE, GLASS TUBE (6.3A/125V)	

<FERRITE BEAD>

FB501	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB502	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB601	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB602	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB603	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB604	1-412-911-11	INDUCTOR, FERRITE BEAD	

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- The components identified by ⊠ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION	REMARK
FB605	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB606	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB613	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB614	1-412-911-11	INDUCTOR, FERRITE BEAD	
		<IC>	
IC501	8-759-980-58	IC TDA8172	
IC504	8-759-103-93	IC UPC393C	
		<POWER MODULE>	
IC601 ⚠	1-810-051-11	POWER MODULE DN-48	
		<IC>	
IC602	8-759-805-37	IC L78LR05D-MA	
IC604	8-759-924-12	IC LM7805CT	
IC605	8-759-929-62	IC LM7812CT	
IC606	8-759-982-10	IC RC7809FA	
IC610	8-759-982-21	IC RC78L05A	
IC2200	8-759-980-43	IC TDA2009A	
		<COIL>	
L502	1-421-465-00	COIL, FERRITE CHOKE 68UH	
L503	1-412-524-11	INDUCTOR 8.2UH	
L504	1-410-669-31	INDUCTOR 33UH	
L505	1-459-104-00	COIL, WITH CORE	
L506	1-422-613-11	COIL, AIR CORE	
L508	1-412-553-11	INDUCTOR 3.3MMH	
L509 ⚠	1-460-173-21	COIL, HORIZONTAL LINEARITY	
L510	1-406-607-11	COIL, CHOKE 15MMH	
L513	1-412-524-11	INDUCTOR 8.2UH	
		<COIL>	
PM501	1-810-061-21	PROTECTOR MODULE PM-39	
		<IC LINK>	
PS2201 ⚠	1-532-675-91	LINK, IC (1.5A)	
		<TRANSISTOR>	
Q502	8-729-119-80	TRANSISTOR 2SC2688-LK	
Q503	8-729-809-29	TRANSISTOR 2SC4159-E	
Q505	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q591	8-729-016-32	TRANSISTOR 2SC4927-01	
Q601	8-729-019-51	TRANSISTOR 2SC4834MNP	
Q602	8-729-019-51	TRANSISTOR 2SC4834MNP	
Q603	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q604	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q605	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q611	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q613	8-729-924-90	TRANSISTOR 2SB1370-EF	
Q614	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q2202	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q2203	8-729-119-76	TRANSISTOR 2SA1175-HFE	
		<RESISTOR>	
R501	1-249-378-11	CARBON 0.56 5% 1/4W F	
R503	1-215-862-11	METAL OXIDE 68 5% 1W F	
R504	1-215-872-11	METAL OXIDE 3.3K 5% 1W F	
R505	1-249-377-11	CARBON 0.47 5% 1/4W F	
R506	1-215-886-11	METAL OXIDE 100 5% 2W F	
R507	1-249-429-11	CARBON 10K 5% 1/4W	
R508	1-249-425-11	CARBON 4.7K 5% 1/4W	
R509	1-249-389-11	CARBON 4.7 5% 1/4W F	
⊠R511 ⚠		CARBON 1/4W	
R512	1-249-389-11	CARBON 4.7 5% 1/4W F	
R513	1-216-393-00	METAL OXIDE 2.2 5% 3W F	
R514	1-249-429-11	CARBON 10K 5% 1/4W	
R515	1-216-363-00	METAL OXIDE 0.33 5% 2W F	
R516	1-249-401-11	CARBON 47 5% 1/4W	
R517	1-215-916-00	METAL OXIDE 680 5% 3W F	
R518	1-215-916-00	METAL OXIDE 680 5% 3W F	
R519	1-249-426-11	CARBON 5.6K 5% 1/4W F	
R520	1-249-423-11	CARBON 3.3K 5% 1/4W	
R521	1-249-411-11	CARBON 330 5% 1/4W	
R522	1-215-886-11	METAL OXIDE 100 5% 2W F	
R523	1-215-862-11	METAL OXIDE 68 5% 1W F	
⊠R524 ⚠		CARBON 1/4W	
R525	1-215-884-11	METAL OXIDE 47 5% 2W F (KV-27TW77/27TW78)	
R526	1-247-887-00	CARBON 220K 5% 1/4W	
R527	1-215-861-00	METAL OXIDE 47 5% 1W F	
R528	1-260-326-71	CARBON 680 5% 1/2W	
R530	1-215-445-00	METAL 10K 1% 1/4W	
R531	1-247-903-91	CARBON 1M 5% 1/4W	
R532	1-215-446-00	METAL 11K 1% 1/4W	
R534	1-249-385-11	CARBON 2.2 5% 1/4W F	
R535	1-216-453-00	METAL OXIDE 270 5% 2W F	
R536	1-249-389-11	CARBON 4.7 5% 1/4W F	
R539	1-215-459-00	METAL 39K 1% 1/4W	
R543	1-249-419-11	CARBON 1.5K 5% 1/4W	
R546	1-249-431-11	CARBON 15K 5% 1/4W	
R547	1-247-883-00	CARBON 150K 5% 1/4W	
R550	1-249-429-11	CARBON 10K 5% 1/4W	
R551	1-249-429-11	CARBON 10K 5% 1/4W	
R554	1-216-371-00	METAL OXIDE 1.5 5% 2W F	
R556	1-249-411-11	CARBON 330 5% 1/4W	
R557	1-249-415-11	CARBON 680 5% 1/4W F	
R561	1-249-429-11	CARBON 10K 5% 1/4W	
R562	1-215-437-00	METAL 4.7K 1% 1/4W	
R563	1-249-429-11	CARBON 10K 5% 1/4W	
R564	1-249-433-11	CARBON 22K 5% 1/4W	
R566	1-249-435-11	CARBON 33K 5% 1/4W	
R580	1-249-411-11	CARBON 330 5% 1/4W	
R601 ⚠	1-202-888-91	SOLID 2.2M 20% 1/2W	
R602 ⚠	1-202-888-91	SOLID 2.2M 20% 1/2W	
R603	1-249-419-11	CARBON 1.5K 5% 1/4W	
R605	1-247-893-11	CARBON 390K 5% 1/4W	
R606	1-247-893-11	CARBON 390K 5% 1/4W	
R607 ⚠	1-202-933-61	FUSIBLE 0.1 10% 1/2W F	
R608	1-215-860-11	METAL OXIDE 33 5% 1W F	
R609	1-216-352-11	METAL OXIDE 1.8 5% 1W F	
R610	1-216-352-11	METAL OXIDE 1.8 5% 1W F	
R611	1-216-468-91	METAL OXIDE 82K 5% 2W F	
R612	1-216-468-91	METAL OXIDE 82K 5% 2W F	
R613	1-215-860-11	METAL OXIDE 33 5% 1W F	
R614	1-215-860-11	METAL OXIDE 33 5% 1W F	
R615	1-249-421-11	CARBON 2.2K 5% 1/4W	
R616	1-249-417-11	CARBON 1K 5% 1/4W	
R617	1-249-377-11	CARBON 0.47 5% 1/4W F	
R618	1-249-377-11	CARBON 0.47 5% 1/4W F	

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

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REF.NO.	PART NO.	DESCRIPTION				REMARK
R619	1-249-377-11	CARBON	0.47	5%	1/4W	F
R621	1-249-377-11	CARBON	0.47	5%	1/4W	F
R622	1-249-377-11	CARBON	0.47	5%	1/4W	F
R623	1-249-377-11	CARBON	0.47	5%	1/4W	F
R624	1-249-377-11	CARBON	0.47	5%	1/4W	F
R625	1-249-377-11	CARBON	0.47	5%	1/4W	F
R627	1-249-377-11	CARBON	0.47	5%	1/4W	F
R628	1-249-377-11	CARBON	0.47	5%	1/4W	F
R629	1-249-388-11	CARBON	3.9	5%	1/4W	F
R630	1-215-857-11	METAL OXIDE	10	5%	1W	F
R632	1-249-417-11	CARBON	1K	5%	1/4W	F
R633	1-249-405-11	CARBON	100	5%	1/4W	F
R635	1-249-413-11	CARBON	470	5%	1/4W	F
R636	1-249-383-11	CARBON	1.5	5%	1/4W	F
R637	1-249-421-11	CARBON	2.2K	5%	1/4W	
R638	1-249-423-11	CARBON	3.3K	5%	1/4W	
R639	1-249-423-11	CARBON	3.3K	5%	1/4W	
R640 ⚠	1-202-893-91	SOLID	8.2M	20%	1/2W	
R643	1-216-379-11	METAL OXIDE	6.8	5%	2W	F
R644 ⚠	1-212-853-61	FUSIBLE	6.8	5%	1/4W	F
R645	1-249-377-11	CARBON	0.47	5%	1/4W	F
R646	1-249-429-11	CARBON	10K	5%	1/4W	
R647	1-249-433-11	CARBON	22K	5%	1/4W	
R648	1-249-414-11	CARBON	560	5%	1/4W	
R649	1-216-431-11	METAL OXIDE	560	5%	1W	F
R650	1-249-405-11	CARBON	100	5%	1/4W	F
R651 ⚠	1-212-954-61	FUSIBLE	6.8	5%	1/2W	F
R652 ⚠	1-212-954-61	FUSIBLE	6.8	5%	1/2W	F
R653	1-249-381-11	CARBON	1	5%	1/4W	
R654	1-216-385-11	METAL OXIDE	0.47	5%	3W	F
R655	1-249-417-11	CARBON	1K	5%	1/4W	F
R656	1-249-381-11	CARBON	1	5%	1/4W	
R657	1-249-417-11	CARBON	1K	5%	1/4W	
R658	1-249-389-11	CARBON	4.7	5%	1/4W	F
R659	1-247-883-00	CARBON	150K	5%	1/4W	
R660	1-249-433-11	CARBON	22K	5%	1/4W	
R661	1-249-406-11	CARBON	120	5%	1/4W	
R690	1-249-423-11	CARBON	3.3K	5%	1/4W	
R691	1-249-423-11	CARBON	3.3K	5%	1/4W	
R2209	1-249-427-11	CARBON	6.8K	5%	1/4W	
R2210	1-249-435-11	CARBON	33K	5%	1/4W	
R2211	1-249-427-11	CARBON	6.8K	5%	1/4W	
R2212	1-249-435-11	CARBON	33K	5%	1/4W	
R2215	1-249-425-11	CARBON	4.7K	5%	1/4W	
R2216	1-249-437-11	CARBON	47K	5%	1/4W	
R2217	1-249-435-11	CARBON	33K	5%	1/4W	
R2218	1-249-441-11	CARBON	100K	5%	1/4W	
R2219	1-249-413-11	CARBON	470	5%	1/4W	
R2220	1-249-430-11	CARBON	12K	5%	1/4W	
R2221	1-249-430-11	CARBON	12K	5%	1/4W	
R2222	1-249-398-11	CARBON	27	5%	1/4W	
R2223	1-249-418-11	CARBON	1.2K	5%	1/4W	
R2224	1-249-418-11	CARBON	1.2K	5%	1/4W	
R2225	1-249-398-11	CARBON	27	5%	1/4W	
R2226	1-249-385-11	CARBON	2.2	5%	1/4W	F
R2227	1-249-385-11	CARBON	2.2	5%	1/4W	F
R2228	1-249-421-11	CARBON	2.2K	5%	1/4W	
R2229	1-249-421-11	CARBON	2.2K	5%	1/4W	

<RELAY>

RY601 ⚠	1-515-684-22	RELAY	
RY602	1-515-516-00	RELAY	

REF.NO.	PART NO.	DESCRIPTION	REMARK
		<SWITCH>	
S501	1-572-707-11	SWITCH, LEVER	
S502	1-572-707-11	SWITCH, LEVER	
		<TRANSISTOR>	
T501 ⚠	1-453-146-11	TRANSFORMER ASSY, FLYBACK (NX2604A3)	
T502 ⚠	1-437-195-14	TRANSFORMER, HORIZONTAL DRIVE	
T503 ⚠	1-424-545-22	TRANSFORMER, FERRITE (PMT)	
T601 ⚠	1-423-593-11	TRANSFORMER, LINE FILTER (LFT)	
T602 ⚠	1-424-220-21	TRANSFORMER, LINE FILTER	
T603 ⚠	1-423-563-11	TRANSFORMER, CONVERTER DRIVE	
T604 ⚠	1-423-615-11	TRANSFORMER, CONVERTER (PIT)	
T605	1-423-582-11	TRANSFORMER, FERRITE (SBT)	
		<THERMISTOR>	
THP601 ⚠	1-809-539-11	THERMISTOR, POSITIVE	
		<VARISTOR>	
VDR601	1-807-288-11	VARISTOR	
VDR602	1-810-053-21	VARISTOR	
VDR603	1-810-053-21	VARISTOR	

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*1-646-717-11	H BOARD		
	*******		
	<CAPACITOR>		
C1001	1-124-916-11	ELECT	22MF 20% 25V
C1002	1-124-903-11	ELECT	1MF 20% 50V
C1003	1-124-903-11	ELECT	1MF 20% 50V
C1004	1-124-122-11	ELECT	100MF 20% 50V
	<CONNECTOR>		
CN154	*1-564-520-11	PLUG, CONNECTOR 5P	
CN155	*1-564-523-31	PLUG, CONNECTOR 8P	
	<DIODE>		
D1004	1-810-039-11	LED UNIT	
	<IC>		
IC1001	8-746-185-11	IC SBX1618-59	
	<JACK>		
J1001	1-695-585-11	JACK BLOCK, PIN (L TYPE) 3P	
	<RESISTOR>		
R1001	1-247-804-11	CARBON	75 5% 1/4W
R1002	1-249-425-11	CARBON	4.7K 5% 1/4W
R1003	1-216-113-00	METAL GLAZE	470K 5% 1/10W
R1004	1-249-425-11	CARBON	4.7K 5% 1/4W
R1005	1-216-113-00	METAL GLAZE	470K 5% 1/10W
R1007	1-216-073-00	METAL GLAZE	10K 5% 1/10W
R1008	1-216-025-00	METAL GLAZE	100 5% 1/10W

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

H **UA**

REF.NO.	PART NO.	DESCRIPTION				REMARK
R1009	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R1010	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W	
R1011	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R1012	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R1013	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R1014	1-216-047-00	METAL GLAZE	820	5%	1/10W	
R1015	1-216-033-00	METAL GLAZE	220	5%	1/10W	
		<SWITCH>				
S1001	1-692-431-21	SWITCH, TACTILE				
S1002	1-692-431-21	SWITCH, TACTILE				
S1003	1-692-431-21	SWITCH, TACTILE				
S1004	1-692-431-21	SWITCH, TACTILE				
S1005	1-692-431-21	SWITCH, TACTILE				
S1006	1-692-431-21	SWITCH, TACTILE				
S1007⚠	1-692-431-21	SWITCH, TACTILE				
		**********				
	*A-1934-415-A	UA BOARD, COMPLETE				
		**********				
		<CAPACITOR>				
C401	1-163-031-11	CERAMIC CHIP	0.01MF		50V	
C402	1-124-916-11	ELECT	22MF	20%	25V	
C405	1-124-916-11	ELECT	22MF	20%	25V	
C406	1-124-903-11	ELECT	1MF	20%	50V	
C407	1-124-903-11	ELECT	1MF	20%	50V	
C408	1-124-916-11	ELECT	22MF	20%	25V	
C409	1-124-903-11	ELECT	1MF	20%	50V	
C410	1-124-903-11	ELECT	1MF	20%	50V	
C412	1-124-916-11	ELECT	22MF	20%	25V	
C413	1-124-907-11	ELECT	10MF	20%	50V	
C414	1-124-499-11	ELECT	1MF	20%	50V	
C415	1-124-499-11	ELECT	1MF	20%	50V	
C416	1-124-907-11	ELECT	10MF	20%	50V	
C417	1-124-902-00	ELECT	0.47MF	20%	50V	
C418	1-124-902-00	ELECT	0.47MF	20%	50V	
C419	1-124-477-11	ELECT	47MF	20%	16V	
C420	1-163-031-11	CERAMIC CHIP	0.01MF		50V	
C421	1-124-916-11	ELECT	22MF	20%	25V	
C433	1-124-482-11	ELECT	33MF	20%	25V	
C434	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	
C440	1-124-907-11	ELECT	10MF	20%	50V	
C441	1-124-477-11	ELECT	47MF	20%	16V	
C442	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	
C462	1-126-101-11	ELECT	100MF	20%	16V	
		<FILTER>				
CM402	1-466-912-21	FILTER BLOCK, COMB				
		<CONNECTOR>				
CN141	*1-564-520-11	PLUG, CONNECTOR 5P				
CN143	1-750-395-11	SOCKET, CONNECTOR 32P				
CN146	1-573-300-11	CONNECTOR, BOARD TO BOARD 18P				
CN147	1-750-395-11	SOCKET, CONNECTOR 32P				
CN148	*1-564-517-11	PLUG, CONNECTOR 2P				
		<DIODE>				
D401	8-719-110-17	DIODE RD10ESB2				
D402	8-719-110-17	DIODE RD10ESB2				
D403	8-719-110-17	DIODE RD10ESB2				
D404	8-719-110-17	DIODE RD10ESB2				
D405	8-719-110-17	DIODE RD10ESB2				
D408	8-719-110-17	DIODE RD10ESB2				
D410	8-719-110-17	DIODE RD10ESB2				
D411	8-719-110-17	DIODE RD10ESB2				
D429	8-719-110-17	DIODE RD10ESB2				
D430	8-719-110-17	DIODE RD10ESB2				
D431	8-719-110-17	DIODE RD10ESB2				
D436	8-719-110-17	DIODE RD10ESB2				
D437	8-719-110-17	DIODE RD10ESB2				
		<IC>				
IC402	8-752-062-86	IC CXA1545AS				
		<JACK>				
J401	1-750-515-11	TERMINAL BLOCK, S 3P				
J402	1-750-517-11	JACK BLOCK, PIN 3P				
J404	1-750-516-11	JACK BLOCK, PIN 2P				
		<JUMPER RESISTOR>				
JR402	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR403	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR408	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR410	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR411	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR412	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR415	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR416	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR418	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR419	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR429	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR430	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR431	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR434	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR435	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR498	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR499	1-216-295-00	METAL GLAZE	0	5%	1/10W	
JR1408	1-216-295-00	METAL GLAZE	0	5%	1/10W	
		<COIL>				
L401	1-410-473-11	INDUCTOR	18UH			
L403	1-410-476-11	INDUCTOR	33UH			
L404	1-410-669-31	INDUCTOR	33UH			
		<TRANSISTOR>				
Q401	8-729-422-27	TRANSISTOR 2SD601A-Q				
Q405	8-729-422-36	TRANSISTOR 2SB709A-Q				
Q406	8-729-422-36	TRANSISTOR 2SB709A-Q				
Q414	8-729-422-27	TRANSISTOR 2SD601A-Q				
		<RESISTOR>				
R401	1-247-804-11	CARBON	75	5%	1/4W	
R402	1-216-113-00	METAL GLAZE	470K	5%	1/10W	
R403	1-216-113-00	METAL GLAZE	470K	5%	1/10W	
R404	1-247-804-11	CARBON	75	5%	1/4W	
R405	1-216-113-00	METAL GLAZE	470K	5%	1/10W	

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION				REMARK
R406	1-216-113-00	METAL GLAZE	470K	5%	1/10W	
R407	1-247-804-11	CARBON	75	5%	1/4W	
R408	1-216-113-00	METAL GLAZE	470K	5%	1/10W	
R409	1-216-113-00	METAL GLAZE	470K	5%	1/10W	
R410	1-249-425-11	CARBON	4.7K	5%	1/4W	
R411	1-249-425-11	CARBON	4.7K	5%	1/4W	
R412	1-249-425-11	CARBON	4.7K	5%	1/4W	
R413	1-249-425-11	CARBON	4.7K	5%	1/4W	
R414	1-247-804-11	CARBON	75	5%	1/4W	
R415	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R416	1-216-647-11	METAL CHIP	680	0.50%	1/10W	
R417	1-216-645-11	METAL CHIP	560	0.50%	1/10W	
R421	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R425	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R431	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R432	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R434	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R435	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R439	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R441	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R444	1-216-095-00	METAL GLAZE	82K	5%	1/10W	
R445	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R446	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R450	1-216-643-11	METAL CHIP	470	0.50%	1/10W	
R451	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R453	1-216-645-11	METAL CHIP	560	0.50%	1/10W	
R454	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R456	1-216-041-00	METAL GLAZE	470	5%	1/10W	
R457	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R458	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R475	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R478	1-216-041-00	METAL GLAZE	470	5%	1/10W	
R482	1-249-417-11	CARBON	1K	5%	1/4W	
R483	1-249-417-11	CARBON	1K	5%	1/4W	
R490	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R491	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R492	1-216-295-00	METAL GLAZE	0	5%	1/10W	
R1438	1-216-081-00	METAL GLAZE	22K	5%	1/10W	

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MISCELLANEOUS
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⚠	1-402-952-11	COIL, DEMAGNETIZATION	(KV-32TW77/32TW78)
⚠	1-406-726-11	COIL, DEMAGNETIZATION	(KV-27TW77/27TW78)
⚠	1-451-315-41	DEFLECTION YOKE (Y34FXA)	(KV-32TW77/32TW78)
⚠	1-451-275-41	DEFLECTION YOKE (Y28PFA)	(KV-27TW77/27TW78)
	1-452-032-00	MAGNET,DISK; 10MMφ	
	1-452-094-00	MAGNET,ROTATABLE DISK; 15MMφ	
	1-544-549-11	SPEAKER	
	1-573-657-11	PLUG, F-PIN	
⚠	1-751-059-11	CORD, POWER (WITH CONNECTOR)	
⚠	8-733-723-05	PICTURE TUBE (A80JYV50X)	(KV-32TW77/32TW78)
⚠	8-733-838-05	PICTURE TUBE (A68KZJ50X)	(KV-27TW77/27TW78)

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REF.NO.	PART NO.	DESCRIPTION	REMARK

ACCESSORIES & PACKING MATERIALS
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	1-467-059-11	REMOTE COMMANDER (RM-Y118)
	9-903-826-01	COVER, BATTERY
*	3-704-319-01	BAG (STANDARD), PROTECTION (KV-32TW77/32TW78)
	3-756-618-21	MANUAL, INSTRUCTION
	3-756-618-41	MANUAL, INSTRUCTION
*	4-030-895-01	JOINT (KV-32TW77/32TW78)
*	4-040-409-01	CUSHION (UPPER) (ASSY) (KV-27TW77/27TW78)
*	4-040-410-01	CUSHION (LOWER) (ASSY) (KV-27TW77/27TW78)
*	4-040-411-01	INDIVIDUAL CARTON (KV-27TW77/27TW78)
*	4-040-412-01	CUSHION (UPPER) (ASSY) (KV-32TW77/32TW78)
*	4-040-413-01	CUSHION (LOWER) (ASSY) (KV-32TW77/32TW78)
*	4-040-414-01	SHEET, CORRUGATED FIBERBOARD (KV-32TW77/32TW78)
*	4-040-416-01	TRAY (KV-32TW77/32TW78)
*	4-040-420-01	INDIVIDUAL CARTON (KV-32TW77/32TW78)
*	4-386-906-01	SHEET, PROTECTION (KV-32TW77/32TW78)
*	4-395-035-01	BAG, POLYETHYLENE (KV-27TW77/27TW78)

9-964-936-01

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